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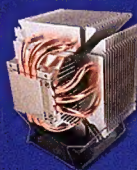
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PLAYED & RATED...

grand theft auto IV

WORTH KILLING FOR!



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19 cooling products to boost PC performance

MOBOS TESTED

ASUS & GIGABYTE's latest

WINDOWS HOME SERVER

Add ons & remote access

GRAN TURISMO 5 PROLOGUE VS RACE DRIVER GRID

Which game takes pole position?

OUR FINAL VERDICT

NVIDIA 9800GX2

SECOND COMING OR FALSE PROPHET?



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EDHEAD

Pretty, pretty

We're trying a little experiment this month.

Indulge me for a moment, and close the magazine and have a look at the cover. Pretty neat, huh? You may be surprised - or not - to discover how much work goes into that single page. There's usually three or four people who work on it over the month, from photography through to the lines and then the typographic challenge of actually laying it all out. It's a constant give and take process, where no one person can get too precious about their particular bit of the project.

It's like any creative process, really. Whether you're creating a game, like the \$US100 million epic *GTA4*; or designing a PC, like Dell's latest desktop machine. Sometimes you get what you want, other times, you have to make sacrifices.

Mostly you get away with it. The team at Rock Star has, I think, certainly done so. I really

don't think anyone will be able to pick the minute changes that were made to allow the game through our



torturous rating system (see the rant in a page or two for more).

In other cases, you can go too far in the direction of near enough is good enough. The XPS 630 on page 54 is a good machine, but it could have been a lot better.

I like to think our cover falls into the former category. An example of when the give, take and sacrifice of any group endeavour produces something pretty schmick, as me old mam used to say.

So, you might be wondering, what's the experiment? If you've bought this from a newsagent you've still got a smashing little mag in your hands, but if you're a subscriber, you should have a pretty good idea of what I'm talking about when I say we're trying a little experiment. One that, I hope, you find very pleasing indeed.

Enough twaddle, though! Speaking of *GTA4* reminds me that, as I write this, I still have to write the damned review of the game! It's a huge release, and a bigger game, with something like 100 hours or more of gameplay depending on how your progress. That, my friends, does not make for an easy review process.

But I'm tough. Me and Niko, we've got a bottle of Vodka to share, and we've invited a couple of Roman's 'friends' around to keep us company while we explore Liberty City. There's some Russian techno on the radio, and it's time to get back to streets.

See you there.

David Hollingworth
dhollingworth@atomicmpc.com.au

NOTE: Forums users jennyb, smadge1, Chaos.Lady, iamthemaxx, Lambo, elvenwhore, Craig Simms, morris, fabercastell3, Caelum, Sir_Substance, foxmulder, TheManFromPOST, Fat_Bodybuilder, beatshoes, Virtuoso, colganator, spyder and most especially TheFrunj are all in hella trouble for making fun of my editor's pic on the Atomic forums. For shame!

ISSUE 87 WINNERS: XFX PRIZE: C Carle, Kangaroo Flat, VIC; ASUS PRIZE: J Leong, St. Kilda, VIC; E Walker, Thornlie, WA.

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Gaming RAGE!

David Hollingworth isn't so much presenting the news, as indulging in an angry – yet informed – rant.

We're going to open with a pretty bald statement, here. Ready? Good.

Some of the politicians who lead us in this country are about as daft as a box of hammers.

Yeah, we know, what an incredibly insensitive thing to say. How can we possibly make such an outrageous claim, you might wonder. Well, we're spurred to such outrageousness by the plight of a poor little game called *Grand Theft Auto IV*.

Fair enough, those words and the Roman numeral may mean little to you (and if that really is the case, we have a convenient review on page 72), but GTA's a rather fun little game about driving cars, managing relationships and getting the job done. Kind of like *The Sims* but with meth addicts and dead hookers, I guess, and therein lies the governmental rub.

Okay, let's stop with the comedy attempts, as, frankly, this is a serious issue. In case you've not been paying attention, while our gaming brethren elsewhere in the world get an ostensibly R-rated and uncut version of the latest GTA epic, we here in Oz are getting an edited version, cut down so as to bring the game in line with an M-rating – currently

the highest allowable rating for a video game.

Now, outside of the GTA debate – and we'll return to that in a moment – the reasoning behind what our governing types think is thus: games are for children, therefore, why do games even need such a high rating? Well, if the original assumption were correct, they might be on to something, but the fact is video games have never really been for children; at least, not just for them.

Here's an interesting fact – the average age of Atomicans is 24. The age range of the people who produce this mag goes from 21 all the way up to 36. And you know what? We all love games. That being the case – though I do know we have a lot of teen readers, too, so, um, you'll be able to buy *Playboy* honestly soon, kids! – why is it that, as adults, we're

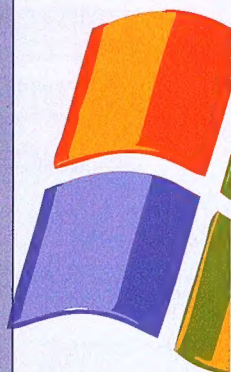
allowed to go watch R-rated fare at the cinemas (the *Saw* series, anyone?), purchase questionable objects at dingy shops in Kings Cross, and binge ourselves stupid on alcohol, why can we not play a similarly adult gaming title?

Truth is, there ain't no good reason why, apart from the lack of education of the people who are sadly in control of ratings.

But before you get too cranky, remember to aim it at the right people. RockStar has caught a lot of flack over this, but can you really blame them? Hundreds of people have worked for years to make this game, to tell an incredible story to us via our favourite medium; do you think they are going to let this blindness stop that? No. I have asked for some official comment, but that's understandably hard to get; however, don't for a minute think that we're missing entire acts of the game and go overseas with your cash. What we're getting is still the same great game being played elsewhere. The changes, we have been reliably assured, are so minor that you may not even notice them.

“Rockstar has caught a lot of flack over this, but can you really blame them?”

SHORT CIRCUITS



While many PC retailers are doing everything they can to extend the life of Windows XP, Steve Ballmer has finally admitted something we suspect a lot of people have known for some time – Windows Vista is in fact a “work in progress”. It can be argued that all software is exactly that, but it's a glaring admission from the Microsoft head honcho. His comment was made at the annual MVP Summit, where he also admitted that a lot of work was still to be done in regards to making Vista work. “Vista is bigger than XP. It's going to stay bigger than XP. We have to make sure it doesn't get bigger still.”

Andy Baio, who runs the blog waxy.org, recently made an incredibly cool – and retro – discovery. He managed to secure the ‘Infocom drive’, a “a complete backup of Infocom's shared network drive from 1989”. Infocom was one of the leading game companies of the time, and amongst a wealth of incredible material, he's found one thing subject that stands proud. There's a mess of unreleased material and plans on there, but the biggest would have to be documents and code for the unreleased sequel to *The Hitchhiker's Guide to the Galaxy*, *Milliways: The Restaurant at the End of the Universe*. It's a fascinating look at games development, despite its age – check out the entry on his blog at <http://tinyurl.com/5su79h>.

AMD's future

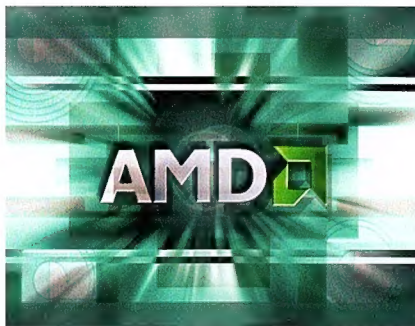
AMD's immediate future may look down, but there's a shining light around the corner.

AMD announced its first quarter financial details in mid-April, and it wasn't a happy day for the once darling of the enthusiast computing crowd. Basically, it's bad money news across the board, with every part of the company experiencing low revenues. Overall, the company made \$1.51 billion, but as staggering as that number may be it still represents a net loss of \$358 million. Still, for the same period last year AMD's loss was nearly double that.

Of course, it's not the hardware's fault. Rather, the poor performance is the result of a seasonal decline further influenced by the slowing worldwide economy. Essentially, with recession a growing threat, and people spending less, its AMD's belief that people are of course not buying computers or computer hardware.

We can only wonder, then, how Intel is breaking records with its own earnings figures.

In answer to the poor results, AMD is dropping future earnings forecasts and has announced that it will cut its workforce by ten per cent and withdraw from any non-core businesses that aren't supporting themselves financially. The company



plans to shift focus back to x86 architecture and the graphics market.

The next three quarters are full of strong soundings releases, however, and AMD remains confident it can hold on to what it's got before actually starting to cut back into Intel's business. We've got some hardware in the Hardcore section that certainly seems to suggest that AMD's renewed focus is already showing dividends. Check out page 40 and onwards for more information.

Bionic brains

Japanese researchers make cybernetic breakthrough. Bring on Major Kusanagi!

One of the main hurdles in creating truly responsive artificial limbs is the lack of control – using muscle twitches only goes so far. However, a team in Osaka University in Japan has made a breakthrough using electrode sheets placed directly on the brain.

Other research groups have done this before, but Atomic HQ is hopeful that if any nationality can lay claim to an innate superiority when it comes to cybernetics, it's the Japanese. Already the team has claimed that it has managed to interpret brain waves and their intended motion with up to 80 per cent

accuracy. Brain waves can be read from outside the skull, but it's much easier to do so with direct access to the cortex. What happens – and four test subjects have undergone the procedure – is that the skull is opened up and the electrode sheet is placed over the central sulcus, a fold in the center of the brain that handles the planning and execution of limb and muscle movement.

It's only a matter of time until we can play Counter Strike using nothing more than the power of thought!

Silicon is dead! Long live Silicon!

Or, at least, that's what UK researchers are suggesting with their latest achievements in looking for computing alternatives. Transistors as small as one atom thick were created from graphene, a heretofore difficult material to use since its carbon-carbon bonds make it very tough, and ideal for such small applications. The stumbling block has been that graphene lacks switchable conductivity; researchers at the University of Manchester got around that by carving quantum dots of the material; dots this small trap electrons. It's all very quantum, but still very cool.

If it really is true that the Elder God

Cthulhu sleeps eternally beneath the sea somewhere between Australian and New Zealand, he – or it – may well be the next entity to feel that Google is invading its privacy. The latest mapping effort courtesy of the search giant is the tentatively-named Google Ocean, though no official announcement has yet been made. Still, Google has been gathering oceanographic experts into a team since last December.

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There's more to being an Atomican than the magazine in your hands!

Each issue of Atomic is merely half of the equation. In these pages you'll always find the latest reviews, results, in-depth features and unique tutorials that you've come to respect, but there's a wider Atomic world to discover online at our official website.



At www.atomicmpc.com.au you'll find a veritable cornucopia of stuff to feast your technolust upon. As each new issue of Atomic goes on sale, we cull the cream of the previous one to go into our online archives; thus, you'll find a wealth of classic material on the website going all the way back to the early, heady days of the magazine. What's more, we're continually going through our back issues for material that may have been missed, so for new readers it's an indispensable collection of stuff.

There's also a wide range of articles and reviews that are written purely for the website, making it an excellent companion to the hardcopy of the magazine. Here's a small sample:

AGP not dead; runs high detail Crysis at 25 FPS

Atomic reviewed the Sapphire AGP HD3850 and found out how much life this hugely powerful card might bring to your old AGP machine.

Multiplayer preview: GTA IV

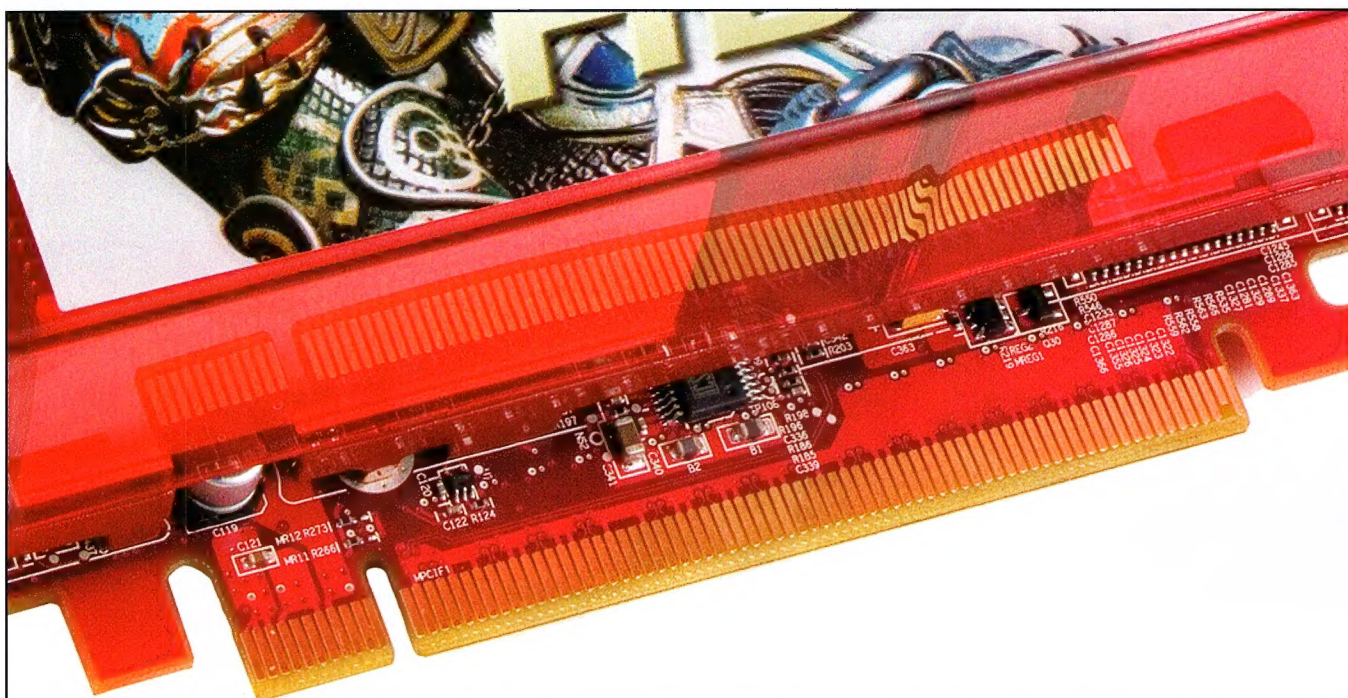
We got an early look at the groundbreaking multiplayer code in Grand Theft Auto IV weeks before we got our review in print.

Interview with a Wii hacker

Bushing – hacker and Atomic's interviewee – discussed all the technical details of hacking Nintendo's wonder console with us.

And the icing on the cake would be our most excellent forums. This is where you find clued-in enthusiasts like yourself, talking about anything and everything, not only in the tech world, but about movies, how terrible Big Brother is, favourite music and more. These aren't just random people – these are some of the finest you'll meet, who have been with the magazine since issue one in some cases, helping people out, making friends, and showing that the Atomic ideal is about more than machines and code. We have more or less monthly prizes for the best post/thread, so get in and have your say.

Come on! Sign up for the site, and our weekly newsletter, today!



David Nalasco

David Field chats to David Nalasco, one of AMD's senior techies for graphics cards. Technicality doesn't just ensue, it haemorrhages.

atomic Multi-GPUs are a niche market compared to the rest of the industry. Given the law of diminishing returns that you get with multi-GPU systems, how are you going to stay competitive in the high end card game?

David Nalasco: One thing we've been guilty of in the past is that we've designed ever larger, more expensive GPUs so that our high end card would be a something like a \$US5-600 GPU. We put all this research and development into designing this expensive card, but the return from it is fairly small because hardly anybody will spend that much on it.

What we're doing now, especially with the HD3800, is focusing more engineering resources on a more reasonably priced product, and then providing a solution for someone who wants to spend huge amounts of money. That comes from multi-GPU scaling. The trick to that is to get your software to efficiently scale up, and the multi-core concept is not new to us on the GPU.

CPUs hit a wall when they were scaled up by increasing the MHz because they got too hot and too expensive. So they went to multi-core, and the undertaking to make applications multi-core aware and multithreaded is still an ongoing task.

We've never had this problem with GPUs. If we want to make a GPU faster, we just add more cores, and as we shrink the transistor size we can

go from 64 to 128 to 256 cores. I mean we're at 360 individual processors in an HD3800 series GPU, and we don't see any clear limitations that would prevent us from increasing that.

But we can only build a chip that's so big and so hot and so power hungry. And at some point going above a certain level of power consumption is, like you said, a law of diminishing returns.

atomic How has the challenge of trying to get multi GPU systems working efficiently been, given there's been a small amount of time for it to mature relative to single card solutions?

DN: In Crossfire, we use multiple frame rendering, which basically queues up frames across multiple GPUs. When we started working on our multi GPU driver, DirectX 9 was fairly simple. We had a good understanding of it and it scaled well. DirectX 10 is a lot more challenging because it's new and has existed only as long as Vista has existed, whereas DirectX 9 has been around for five or six years.

Some of the things that made multiple GPU processing difficult in DirectX 10 was that some of the more sophisticated render effects take the results of one frame and use them to determine what you see in the next frame. Take motion blur as an example. There, you want to see how fast an object is moving, and if it's moving really fast

you blur it across multiple frames. That means that you have to keep track of what happened in the scene one, two, and three frames ago.

With multiple frame rendering you have different frames on different GPUs, so you have to transfer data between GPUs, which takes up a lot of resources and prevents you from getting scaling in a lot of cases. You'll never be any slower than a single GPU, but you can get into a case where, say, three GPUs aren't much faster than a single GPU, maybe only ten per cent faster. And we want to avoid that wherever possible.

The tough part is that a lot of it has to do with the developer. How they architect their game and rendering algorithm has a big impact on us, so we try to work with them and show them certain techniques that they can use to allow our driver to handle their game more efficiently.

Certain games that we find more challenging were just designed in such a way that they make it very difficult for us to optimise around their issues. A lot of that has to do with our DirectX 10 driver still maturing, but we're just starting to see the first round of games that are using DirectX 10, so even the developers aren't that familiar with it.

I'm fairly confident that it's going to improve and we're going to start seeing better scaling, much like we see in DirectX 9 already; it's just taking some time for us to work out those details.



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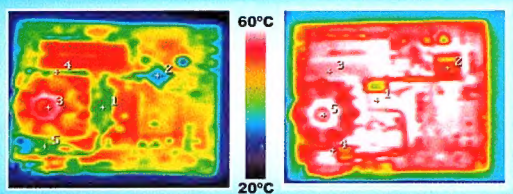


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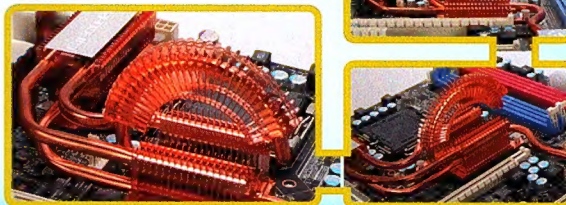
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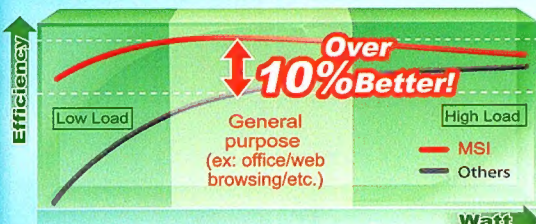
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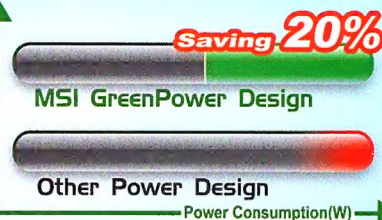


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atomic How much of a jump is DirectX 10.1 from DirectX 10?

DN: It's an incremental change. There are a lot of what seem like nitpicky little features added here and there, but certain algorithms can really benefit from these small changes. Take global illumination for example.

Global illumination is a way to capture all the lighting in the scene including multiple bounces, multiple light sources and area light sources all at once. It gives us an image that looks like a ray traced image, but is very fast. Doing that with traditional techniques is just not feasible.

Normally when you have light sources in a

graphics card do some GPGPU work, like physics?

DN: I'm saying not yet, because the IGP doesn't have enough power to be a dedicated GPGPU at this point – but there's no reason why it can't be done in the future when it's more powerful.

It's a research area. There are so many things that can be done with GPGPU. Our initial focus and research in that area was on intensive, high performance processing tasks like modelling and simulation for oil companies or financial analysis.

That doesn't mean that you can't also use GPGPU for more consumer-oriented tasks, it's just an area of future research, and until we nail

I'll give you an example. This isn't really physics, but it's related. Say pathfinding: you have to determine, for a whole bunch of objects in the scene, whether they have visibility in the scene or you have to calculate the most optimal path through some obstacles. Each path that you're calculating is a serial task; something that would run well on a CPU. But imagine if you have to calculate hundreds or thousands of these tasks per second. This is something that a GPU could potentially handle.

Now of course your GPU is also doing the rendering, so you have to very carefully look and ask, "even if we could do that on the GPU, does it make more sense to burden the GPU with that task, or should we use some free CPU core that would be otherwise sitting idle?" These are all the balances you have to make, so to ask would physics run better on a GPU is a very broad question; it's what kind of physics are you talking about and what else is the GPU doing and how free is the CPU.

There's also the communication between the GPU and the CPU to consider, because if you use the GPU to start doing some of the processing, you have to communicate the results back to the CPU so that it can do something. "Now that I've determined that these two objects are colliding, what does that mean?" The CPU has to go and figure that out. So you have to have efficient bandwidth.

Actually, bandwidth is less of a problem now, it's actually latency. If you're doing something like physics, if the physics affects how you interact with the game world, you need the response to happen immediately. So if I run into an object, and the detection that I've hit that object gets back to the CPU three frames later, now there's a lag in what's happening in the game versus how I'm controlling it, so we need a low latency connection.

This is something where having everything on one die, like Fusion, can potentially help.

David then went on to have a swipe at Intel and its parallel plans, talk about the silicon layout of Fusion -- AMD's new single chip CPU/GPU, bitonic sorting and other new ways of approaching traditional computer problems for the parallel world, video coding and much more.

Hit www.atomicmpc.com.au for the full transcript of the interview.

“What a GPU is currently not used for is calculating how a character animates and responds to its environment.”

scene, you calculate how much light is coming from each light source for every pixel, and traditionally games just calculate the contribution from all these different light sources. You get into problems when you have a lot of light sources in the scene (like hundreds), because performance just scales down linearly.

Another problem is when you have area light sources, like if an entire wall is glowing one colour. It's hard to define that as one light source because the light is actually coming from multiple locations.

Then there's the multiple bounce problem. If we want to do things like ray tracing, we have to do the calculations multiple times for each bounce that we want to calculate, which slows things down even further.

To do global illumination in DirectX 10, we implemented a technique that uses something called cube maps, which have been in DirectX for a while. For any given point, a cube map renders how the scene looks from that point from six different directions, like the faces of a cube. We don't do it from every pixel in the scene, we break the scene up into cubes, and for each cube we calculate how the scene looks in all six directions from the centre of that cube; we can break the scene up into as many cubes as we want.

In DirectX 10 you can only render one cube map at a time, but in DirectX 10.1 there's a feature that lets us render multiple cube maps in parallel. It seems like a small, simple change that only that a developer would normally be interested in, but because we can now calculate multiple cubes simultaneously what would have taken hundreds of passes before now takes just a small amount of passes through the rendering engine.

atomic When hybrid graphics are released, do you have any plans to let the integrated

down the algorithms for that sort of thing it's hard to know how much processing power you're going to need to make it interesting.

So while our IGP chips support the full feature set of our discrete graphics, for GPGPU to be interesting you have to be able to exceed the performance of a CPU by a significant margin, otherwise you might as well just do it on the CPU.

atomic How close to a CPU is an IGP in terms of raw processing power?

DN: Our IGP can do about 20 Gigaflops, which is probably in the realm of single, possibly dual core CPUs. But that's just raw throughput, you don't always get your peak performance when you try to do GPGPU stuff. I think the theoretical processing power of a 3GHz quad core is about 96 gigaflops, assuming SIMD is enabled (or else the CPU would be very slow).

atomic What kind of discrete graphics card would be powerful enough to dedicate itself to physics calculations through GPGPU?

DN: Physics is a very broad problem. If you look at how physics is done today, the only things GPGPU is being used to compute physics for are very simple special effect physics like the foliage moving back and forth in *Crysis*. It doesn't affect the gameplay in any way, but it makes things look a little better and can add more objects into the scene and calculate their movement.

What the GPU is not currently used for is calculating how a character animates and responds to its environment; things like collision detection and line of sight. Currently it's done on a CPU, but if you look at just how these algorithms work, you could theoretically say that certain types of physics would actually run well on a GPU. I'm not saying that they are currently today.



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Looking at
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Give me the power

The power supply is an often overlooked component, even though it's vital to your machine. But how do you interpret its specs, and determine what you need? Ashton Mills reveals all.

The primary task of a power supply is to take the AC (alternated current) input and convert it to DC (direct current), and to do so at a variety of voltages required by the components of a PC. The specs of a PSU are defined by a number of factors, so how can you tell what to look for?

What's watt?

The most important function of a PSU is its output power, measured in watts. In simple terms a watt is the rate at which energy is transmitted by a circuit, although other factors play a role (such as resistance). Generally, wattage is measured by multiplying amperage by voltage.

PSUs are commonly marketed by their total output power in watts. The value is a total of all the separate output rails combined (more on this below), but it can sometimes be misleading: firstly, as a combination of all the rails, you don't necessarily get access to all that power where you need it most. Many PCs these days rely heavily on the +12v rail, and two identically rated 500W PSUs can provide two different output maximums on the +12v rail, for example.

Secondly the rated output power isn't a hard

limit. A 500W PSU can output more than this, but it's not rated to do so efficiently or stably, and ultimately protection circuits kick in.

Finally, a PSU's output power is also rated for a given temperature. Any good PSU for a PC will be rated for 50 degrees Celsius. The temperature rating is important – as a PSU heats up, its efficiency can decrease. This is known as the de-rating curve, and we'll cover this more below.

You will also see some PSUs advertised with a 'peak' rating. Ideally, don't use this as a consideration for purchasing, look for the 'real'

rating that the PSU can consistently deliver. Any good PSU usually has a ceiling above its rating, but if you need that much power you'd be better off getting a more powerful PSU in the first place. That said, some cheaper PSUs are rated *higher* than the real output wattage they can reliably deliver. This is a dodgy practice but is usually relegated to low-end yum-cha units.

Rails

Each DC output is known as a 'rail', and PC PSUs are required to deliver a number of rails: +3.3v, +5v,

IS BIGGER BETTER?

In our culture the tendency is to view bigger as better and PSUs are no different – we now have 1200W+ PSUs on the market. In truth, however, most enthusiasts – let alone normal people – would have a pretty hard time trying to load these babies. In other words, these PSUs are more for e-peen value than actual functionality, with one exception: efficiency on load. A 1000W PSU should, for example, be able to deliver 600W without skipping a beat, ensuring that its efficiency remains high under load and doesn't heat up too much. Overall, however, you *don't* need the beefiest PSU you can find. Even a quad-core three-way-SLI system can get away with an 800W PSU nicely.

Antec

Model / 型号: Neo HE550
550 Watt Output

AC Input: 100V - 240V~ 9A ; 50Hz / 60Hz
交流输入

直流输出	DC Output Voltage	+3.3V	+5V	+12V1	+12V2	+12V3	12V	+5VSB
	Max. Current	24A	20A	18A	18A	18A	0.8A	2.5A
	Available Power	79.2W	100W	504W			9.6W	12.5W
	Total Power	550W continuous output at 50°C ambient temperature						

Neo HE - High Efficiency

An example of a power supply wattage breakdown. Note how 90 per cent of its output power is dedicated to the +12v rail, and that it's rated for its output power at 50 degrees celsius.

“...as it gets hotter the PSU's fan will spin faster in an effort to expel the heat...”

+5VSB (standby - active as long as there is current from the wall, lets you turn your PC on from the front button), -5v, -12v, and the ever important +12v.

When it comes to buying a PSU the main stats you'll see advertised (on the box and the PSU itself) are the total wattage and how this is divided among the various rails. The output of a particular rail is determined by multiplying the voltage of the rail by the amps - for example, +5v at 30A would be 150W.

The eagle eyed among you may notice that, depending on your PSU, the values don't always add up - you might see the +5v rail at 30A and +3.3v rail at 24A given as a total of 170W. But if you do the math, it should be around 230W.

What's going on? Even though the two rails have a maximum of 30A and 24A respectively, the total output power is 170W between them - meaning one or the other could be maxed out at a time, but not both at once. Usually this isn't a problem; you'll often find the +3.3v and +5v rails aggregated this way (because the +3.3v is actually drawn down from the +5v source), and they provide enough power for their given duties.

Note that once upon a time CPUs used to run from the +5v rail, but these days they use +12v. Any motors also draw from +12v - so fans, hard drives, optical drives, pumps and so on - as well as your GPUs. In fact, most of your PC's load, as much as 90 per cent, comes from the +12v source. This is one reason it's good to look at the distribution of power on a PSU's rating - it doesn't matter that it's a 700W beast if only 400W is on the +12v rail and you need more than this to satiate your gear.

Efficiency

Efficiency is the second most important feature to look for after output power. A PSU's efficiency rating is effectively a measure of how well it performs. In other words, how much energy is wasted in the conversion process. A PSU with 80 per cent efficiency will pull 500W from the wall to deliver 400W for your system, while a PSU with 70

per cent efficiency will need to pull 570W from the wall to do the same. On the surface this means a more efficient PSU is slightly cheaper to run, but there's a more important benefit: wasted energy is lost as heat, and heat is the number one enemy of a PSU.

As a PSU gets hotter it becomes less efficient and its maximum output power drops. In turn, its efficiency drops and the process spirals. Additionally, if it gets too hot, it becomes harder for the PSU to maintain the rails within their regulation (usually +/- five per cent) and since your gear is developed with these specs in mind, the result can be instability or crashes.

This loss in performance as a PSU heats up is known as the de-rating curve, and is the reason a PSU is rated for operation at up to a certain temperature. A 500W PSU rated for 50 degrees Celsius is rated to provide 500W at up to 50 degrees, past this its maximum output can drop. Considering the insides of most cases can usually get rather warm, there's a good reason PC PSUs are left against the 50 degrees threshold.

Naturally as it gets hotter the PSU's fan will spin faster in an effort to expel the heat, and it's not a lost irony that if it's getting hot due to a high load then it's usually pulling in hot air from inside the case as well.

Today any good PSU will be branded with the '80 plus' sticker that shows it can maintain 80 per cent efficiency for its typical load (usually 50-75 per cent of its rated power). It's true that some PSUs lose efficiency at low power loads (say, 20 per cent of power) as well as at very high loads (especially when reaching 100 per cent or more). Naturally, if efficiency drops, more heat is generated, compounding any heat issues. These days, however, more and more PSUs are increasingly able to deliver 80 per cent efficiency

SINGLE OR MULTIPLE +12V?

The ATX specification states that no more than 240W can pass through a single wire, as this much power could cause enough heat to melt the insulation and possibly start a fire.

Contrary to what you might think, bar very high end (1000W+) PSUs that actually do have two or more separate +12v sources, most PSUs with multiple rails draw from the same +12v source. That is, when you see '+12v1, +12v2, +12v3' on your 850W PSU it's actually a single +12v rail split into 'virtual' rails, all in the name of safety. These 'rails' are simply limited connections that cap the maximum draw through any one rail.

So how does a single rail +12v PSU with an output more than 240W on the +12v rail get away with it? Herein lies much of the debate: if you think about it, both single and virtual rail PSUs all still draw from the same single +12v source, and all use multiple leads with various connectors. In other words, the distribution of power is inherently limited by the cabling - a single PCI-E 6-pin cable for your GPU, for example, isn't going to be supplying more than the GPU demands (which is far less than 240W), and loading up a SATA cable will use even less. Across your whole machine you may use 500W or more, but no set of cable individually carries this much. It's not surprising, then, that many high end PSUs, even with multiple +12v rails, sometimes list output power above 240W for a given rail.

Additionally, there's one argument in favour of a single +12v rail: the maximum output power is available to use, whereas with a multiple rail configuration you can 'lose' output power from the headroom of each rail that doesn't get used (you're limited by what connectors are attached to each 'virtual' rail).

So the argument basically comes down to flexibility; a single +12v rail is more flexible for whatever your system demands, though technically a multiple 'virtual' +12v rail PSU is supposed to be safer.



Seasonic introduced some of the first 80 plus PSUs to market, which no doubt helped in making them some of the more popular 'quiet' power supplies.

rated voltages. Some say overclocking can be limited by PSUs with poor results here, but as long as they stay within limits when under load you're fine. PFC is a little complicated given the space to elaborate here, but let's just say it's good if it's as close to 'one' as possible, and most PSUs do this just fine.

Modular versus not

An old wives tale used to put modular PSUs at a disadvantage, stating that the extra resistance induced as a result of the modular connections was a cause for instability. Poorly made modular PSUs could also be problematic by creating loose connections, adding another level of complexity to diagnosing power problems.

In truth, when modular PSUs first appeared, these tales were based in fact, with some badly made modular PSUs giving rise to the wisdom that modular wasn't the way to go.

But this isn't the case anymore. Any good PSU with modular outputs usually ensures both tight fitting and snug connections, and doesn't suffer any sort of issues related to increased resistance – after all it's just another connection, same as plugs on the end of the cables.

So don't be afraid to go modular. Additionally,

HOW MUCH POWER DO YOU NEED?

There are a number of power calculators you can use online (try extreme.outervision.com/psucalculator.jsp for example) but keep in mind they're only a guide. To give you a rough idea, however, an overclocked dual-core SLI system with a couple of drives might use around 450-500W at peak, and 250-300W at idle. If this sounds like you, and allowing for a minimum 30-40 per cent headroom, a 700-750W would be sufficient.

“Some say overclocking can be limited by PSUs with poor results here...”

less important are ripple, noise, and PFC. Noise and ripple (or regulation) are used to describe the cleanliness of a rail's output, how much the voltage fluctuates and how tightly the rails adhere to their

modulars provide the benefit of being able to hook up only the cables you need, in turn reducing cable clutter and ultimately improving airflow within a case.

across all loads – but check when you buy to see if this is the case.

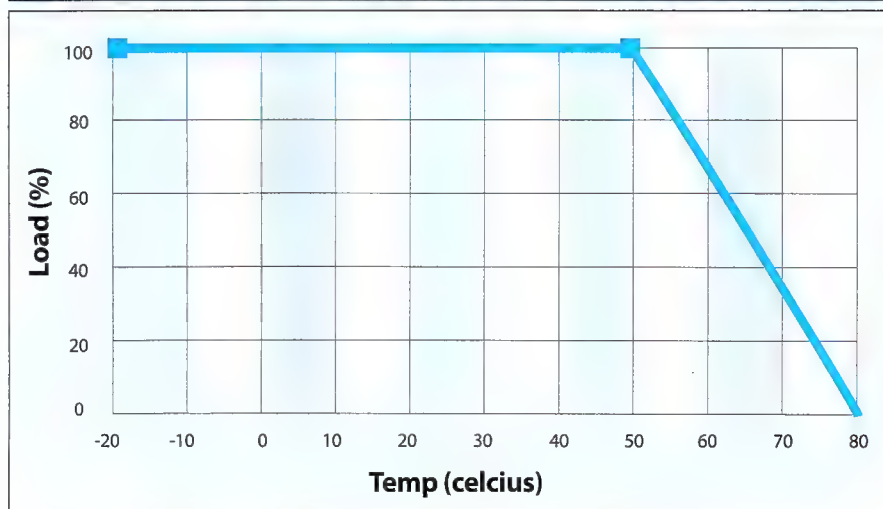
It's for this reason that it's recommended to get a PSU with at least 30-40 per cent more power than you think you'll need under load. This isn't about headroom for future growth (you should've taken that into account already), it's about ensuring you don't approach the PSU's maximum output power to ensure maximum efficiency and minimal heat. The secret to a stable and quiet PSU is a higher output power and a high efficiency.

But even though 80 per cent efficiency is rather good (PC PSUs used to be 70 per cent and less only a few years ago) wouldn't it be better if it could be 90 per cent? Indeed, a push is already under way in the industry to see a new 90 per cent standard introduced, and we may well see '90 plus' PSUs in the next few years.

Ripple, noise, power factor correction

Other factors you'll read about but which are

OPERATING DERATING CURVE



As a PSU passes its optimal operating temperature, its maximum output power decreases.



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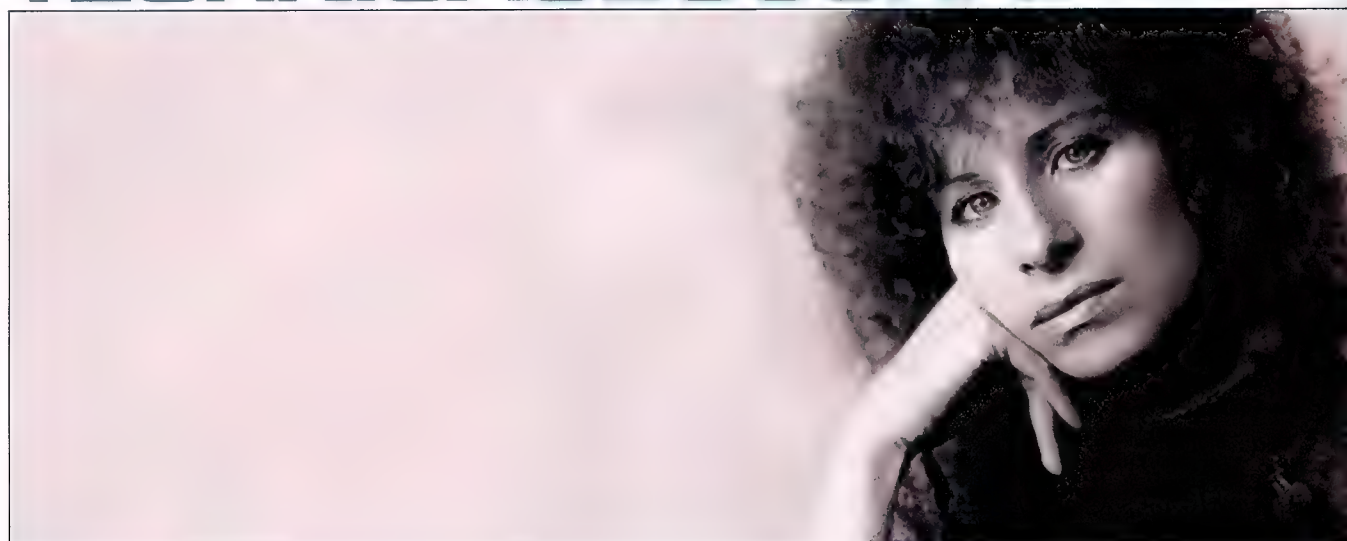
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The big picture behind technology and the world around us



The Streisand effect

Ashton Mills just wants information to be free. He's very old school like that.

It's more than a little intriguing in this day and age, where the internet is no longer a Hot New Thing, that people, companies, and sometimes even entire countries (here's looking at you, big C) are still unaware of the impact it has on human communication.

This is the information age. Let's just mull on that a moment – the *age of information*. In all of human history there has never been anything like it, it is whole and complete and filled with the data of our existence, our very being digitised and made manifest.

The net has its own life, it *breathes*. And information is its lifeblood.

So what do you think is likely to happen when someone tries to censor information, no matter how small? What happens when someone or something tries to forcibly remove a little part of this here internet thing?

People don't like being silenced, and they don't like others being silenced. When this happens, rather than having the information removed, the opposite occurs – it spreads. It spreads much farther, and much faster, than if it had been left alone in its own little pocket of the universe.

It's a phenomenon that even has a name: the Streisand effect.

The origin of the term comes from a news story that hit in the web in 2003 about Barbara Streisand who, as is the American way, sued a photographer for posting a picture of her beachfront home on the web with the aim of having it removed. The photo itself was just one of thousands buried on a site documenting coastal erosion.

But after news broke she was suing the photographer, the site with the picture became an internet hit and Ms. Streisand's attempt to have less people see the photograph led to hundreds of thousands more seeing it instead.

The most recent example of this, or at least most techy recent example, was when Creative deleted posts and removed files from Brazilian programmer Daniel_K (Daniel Kawakami) who had in recent times, and as a Creative user himself, been fixing Creative's drivers for the community.

Creative isn't exactly known for good driver support, so Daniel_K took it upon himself to do what Creative wouldn't and upload improved drivers for others to use. And use they did – by the time Creative came knocking with a cease and desist order, along with removing his files and deleting his posts, he'd had over 100,000 downloads.

The Creative forums didn't take kindly to this and within the space of two days the story hit Slashdot, Digg, and then mainstream news sites including Wired. Suddenly, the story was everywhere and Creative's behaviour came under worldwide scrutiny. A day later, the thread where Creative posted its message to Daniel_K was over 200 pages long, and a dozen new threads

had been created, all filled with users expressing their displeasure at Creative, many of whom created accounts just to do so and included customers who now said they would no longer buy Creative products. Here the company made its second mistake – it pulled the original post down, replacing it with a less than satisfactory apology – but the original post was mirrored and can still be found online (see creative.edited.us).

The irony probably hasn't been lost that if it had let Daniel_K do his thing, or even supported him, that the company would be in a better position. Instead it managed to trash its reputation around the globe in less than a week. The Streisand effect had hit.

In the words of John Gilmore, "The net interprets censorship as damage and routes around it." Users will mirror information under threat of censorship – posting it on websites, image sites, email, YouTube, torrents, and any other medium they can find

to keep it in the open. The more it's suppressed, the faster and further it spreads – a lesson many individuals and companies have yet to learn.

Now if only the Government can get a clue about it, too.

Atomic would never [redacted] of [redacted] Ashton.
amills@atomicmpc.com.au



“ In the words of John Gilmore, 'The net interprets damage and routes around it.' ”

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VISTA, at your service!

Microsoft has pushed out its first major update pack for Windows Vista, and everyone's curious about what it offers. Security? Performance? A different-coloured screen of death? Logan Booker takes a look.

If you were to count age in hours, Windows Vista would be around 12,000 – or close to it. Thankfully, we prefer to measure age in years, in which case the operating system has barely clocked one and a half. That's like, nothing, in human years.

In this time, Vista hasn't quite taken off like Windows XP did when it first pushed its way out of Redmond's womb in October of 2001. Then again, it's not like Windows XP was extremely popular to start with. Much like a cat given as an unwanted birthday present, or an errant chest hair whose fellows have abandoned him for the warmer reaches down south, XP grew on us. Forget the fact it had five years to do so, many say it's the best operating system the software giant has ever produced. Well, the ones who aren't diehard MS-DOS fans anyway.

The reasons why Windows XP is still firmly

entrenched on hard drives the world over can be traced back to two events – Service Pack 1 and Service Pack 2. SP1 wasn't terribly exciting – containing your average collection of security and bug fixes – but it did give the OS USB 2.0 support, which we're sure you'll agree was a very good thing.

No, it was SP2 that made XP for us. It gave the OS features we take for granted now, such as the built-in firewall, non-execute (NX) protection and faster boot speeds. Internet Explorer even got a pop-up blocker, finally putting it on par with browsers such as Mozilla Firefox.

If we use XP as the benchmark for what an MS operating system should be like, then Vista has a few years to go before it can compete. Vista Service Pack 1 is the first major step towards this goal and as such, deserves a solid, investigative poking. An Atomic poking, if you will.

What's in the box?

Before we start, here are the specifications of the system we used to perform all our tests:

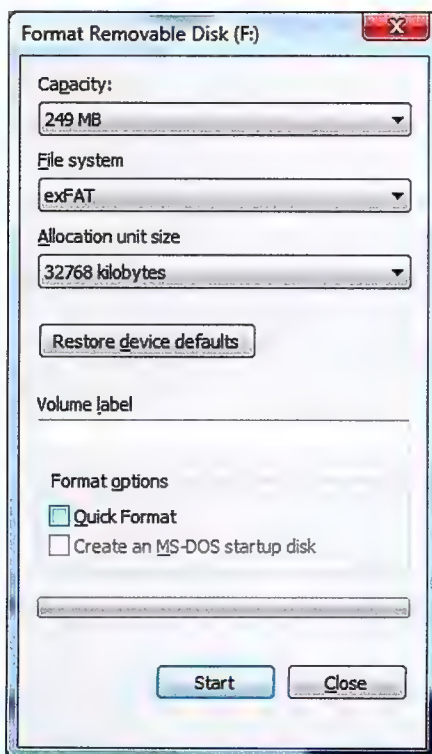
CPU	Intel Core 2 Quad Q6600 2.4GHz @ 3GHz
Motherboard	Gigabyte GA-P35-DS4Motherboard
RAM	2x 1GB Crucial Ballistix PC2-6400 @ 800MHz
Graphics card	NVIDIA GeForce 8800GT (169.25 ForceWare)
Primary hard drive	160GB Seagate Barracuda 7200rpm
Secondary hard drive	400GB Seagate Barracuda 7200rpm

Each operating system was installed clean on the primary drive and the latest (at the time of writing) non-beta graphics and system drivers loaded. The integrated Vista SP1 x86 image that is available to MSDN subscribers was used for our tests.

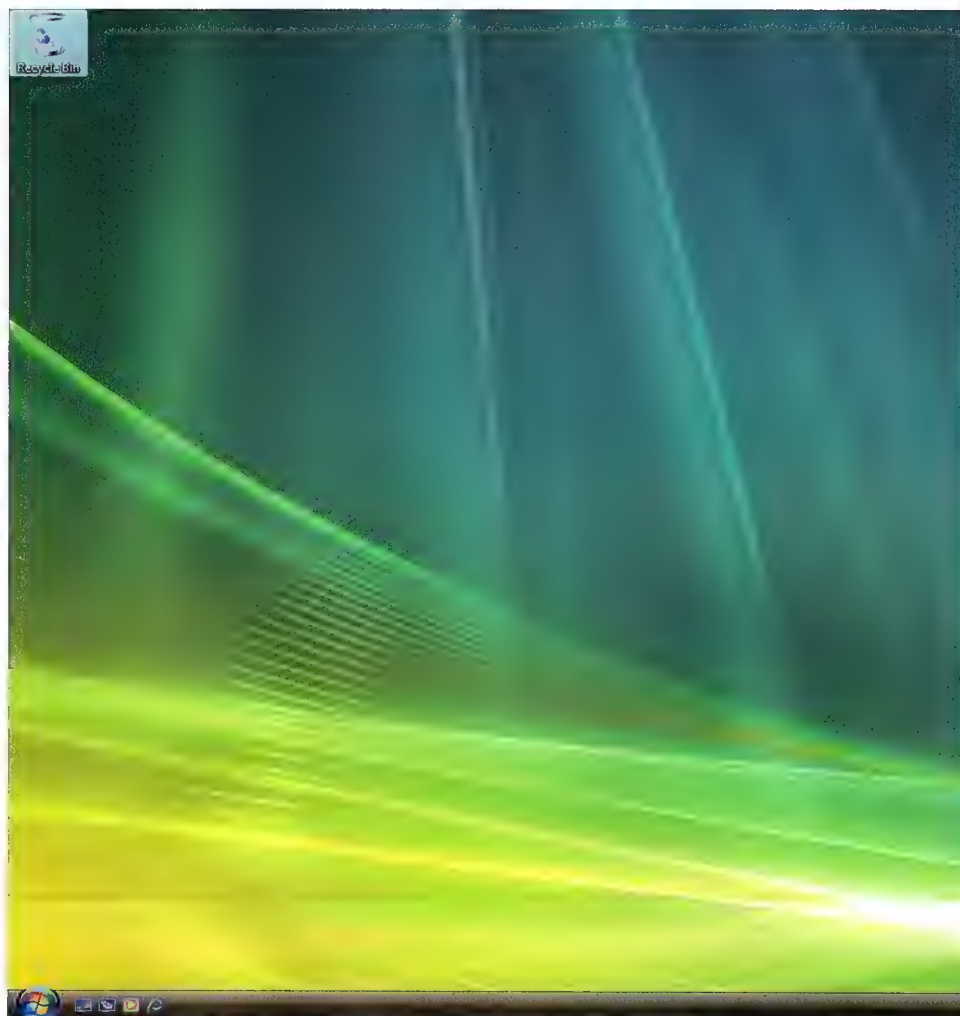
If you're planning on installing SP1 from the standalone distribution, you're looking at a 450MB download. If you're running a PC that's already fully-patched, then you should only have 65MB to worry about. You'll need the former file in order to create your own integrated Vista SP1 install disc (see 'Why Vista SP1 Hates vLite').

Change is a good thing

Beyond the bug fixes and cosmetic improvements, there's plenty of newness in Vista SP1 – from the reported 75 per cent increase in the load speed of Event Viewer (yawn) to the



exFAT: nothing to do with your chunky former girlfriend.



The SP1 desktop looks like, well, the original desktop. You'll need to look a little deeper to see the changes.

inclusion of DirectX 10.1 (yeah).

The service pack also introduces exFAT (Extended File Allocation Table), a file system that supports 32,768KB sectors via the Format command, up from the 256KB and 64KB maximums of FAT32 and NTFS respectively. exFAT debuted with Windows CE 6 and is designed with flash storage in mind.

We can't recommend you start formatting all your drives with the file system, as Vista SP1 is the only mainstream operating system that can read it, at least for now. It should see wider use in the future, thanks to lower administrative overheads, faster free space calculation and support for 16EB, or Exabyte, files.

Microsoft has also slipped in more support for HD DVD and Blu-ray, not that you'll need the former for much longer. 802.11n is also in for those of you who can't stand Ethernet cables.

If you happen to have a habit of deleting important OS files, Vista SP1 includes an improved Startup Recovery Tool that can more competently handle such issues.

Microsoft says that the number of User Access Control prompts in many situations has been reduced from four to one. We can confirm this as true, but you're still crazy to have it on at all considering the amount of mischief it causes. For

instance, UAC prevented us from running our Crysis benchmarks until it was disabled.

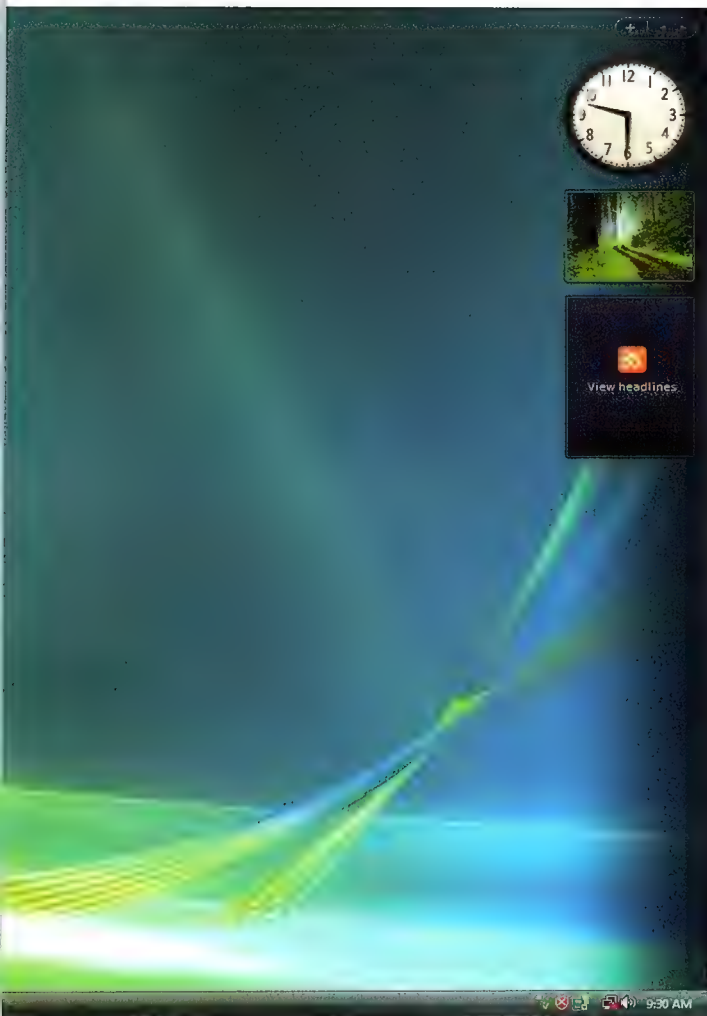
A clean start

Our first step was to install Vista SP1 onto a freshly formatted drive. As far as installation prompts go, not much has changed. You still enter your product key and the appropriate version of Vista will be installed. We went with Home Premium, as this is a good compromise between owners of Basic and Ultimate.

For Vista SP1, it took 25 minutes 13 seconds to get from the initial file copy DOS screen to a desktop we could interact with. Original Vista managed it in 24 minutes 52 seconds, so while SP1 is a little slower it's nothing to lose sleep over.

Boot space

Can you expect a huge difference in initial boot times with Vista SP1? Not according to our tests. With video card and chipset drivers installed, both SP1 and original Vista took roughly the same amount of time to start up, with the former clocking 24 seconds and the latter 26. SP1 however comes with a new feature called 'hotpatching' that allows certain hotfixes to be applied to the operating system without triggering a reboot. Essentially, boot times have remained unchanged, but you shouldn't have



to reboot as often.

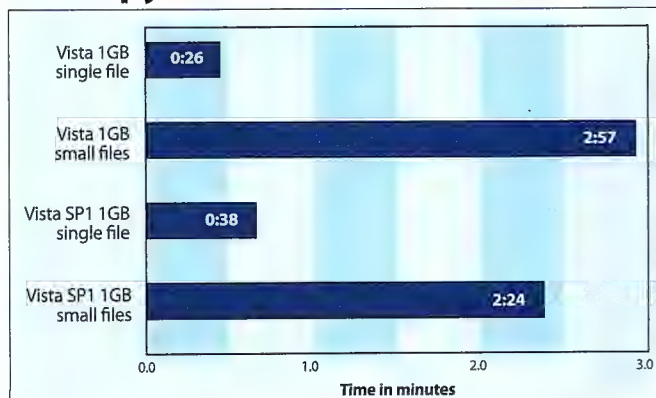
What we did find remarkable was the smaller install size – 4.16GB compared to 8.06GB of vanilla Vista. We're not sure what Microsoft trimmed, but we're happy to accept an extra 4GB in our pocket.

Copying, please wait...

How can you mess up something as simple as copying files? Somehow between Windows XP and Vista, Microsoft managed to completely screw this basic OS feature, forcing savvy users to turn to the command prompt to get things done. On top of this, remote file copies in Vista can cause Explorer to crash or lock up.

So how does SP1 rate?

File copy times



atomic



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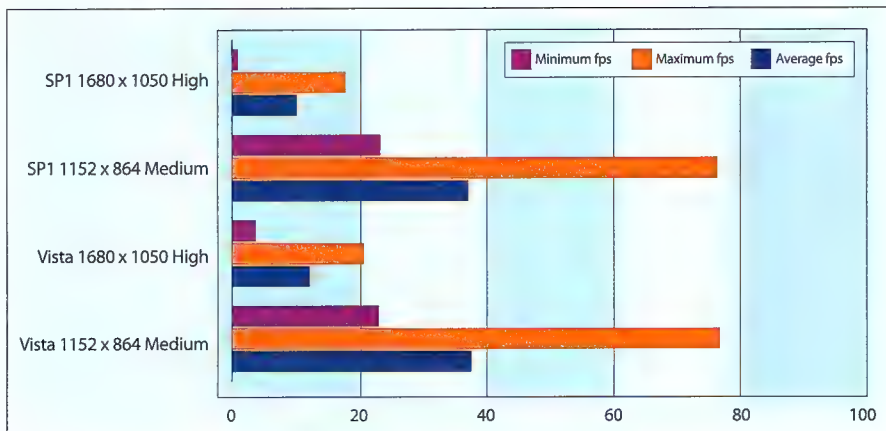
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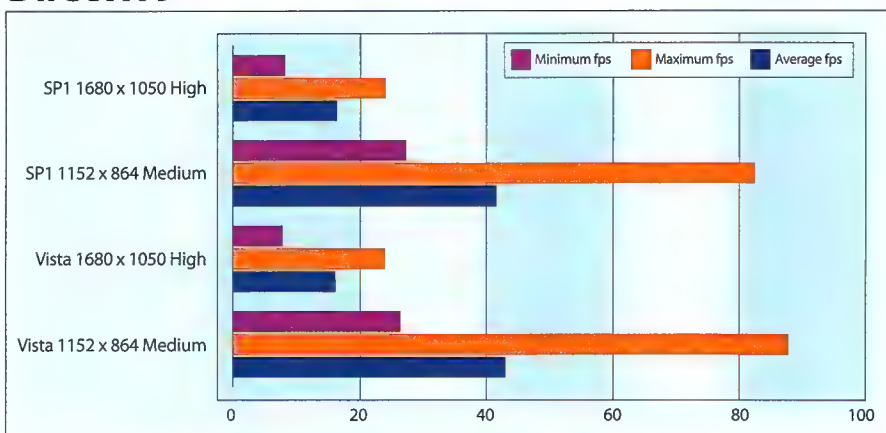
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Direct X 10



Direct X 9



The estimated time calculation for file operations was noticeably faster. During our usage it took less than two seconds for the OS to come up with a time that was reasonably accurate. We can't recommend planning your day around it, however.

To test, we copied 17,375 small files totalling 1GB of data between the primary and secondary drives. We then copied a single 1GB file between the drives. Both copy operations were timed with a stopwatch, with timing started when the copy dialog box appeared, and stopped when it disappeared.

Now, Microsoft claims that file transfer speeds in SP1 have increased by around 25 per cent. Let's see how that number held up.

The results of our tests were interesting to say the least. Small files copied 19 per cent faster in Vista SP1, but our large file copy managed to trail original Vista by 31 per cent. We double-checked these results and came up with similar numbers, so we hope Microsoft is aware of the issue.

Games we play

To test both Direct3D 10 and Direct3D 9 performance, we installed *Crysis* on our test machine and updated it to the latest version – 1.2.1. We then ran the following benchmarks:

- 1680 x 1050, High detail, 4x AA
- 1152 x 864, Medium detail, no AA

These settings were used for the D3D 10 and D3D 9 tests, for a total of four benchmarks per operating system. Our objective was to replicate the experience of a gamer with an above average PC and one with a more run-of-the-mill machine.

Okay, we were not expecting miracles from Service Pack 1, but these results clearly show that gamers have little to gain from the upgrade. While minimum frame rates in Direct3D 9 saw a

tiny improvement, D3D 9 performance overall was lower and D3D 10 suffered a minor hit also. They equate to a single frame for the most part, so no need to panic. If you're wondering why D3D 10.1 did nothing to help performance, it's because the API has yet to be utilised. Until we have hardware to support its functionality and developers begin utilising it, D3D 10.1 will lie dormant.

We should mention we ran SuperPi Mod on both system, but the test returned identical results. Nothing to see here...

Test inside a test

What better way to check SP1's performance than with Microsoft's own Windows Assessment Tool, or WinSAT? What's the point, you may wonder, when it only provides vague numbers to rate components? If you dig deeper, you'll find WinSAT actually stores a lot more information than it lets on.

Using Stardock's TweakVista utility, we were able to easily drill down into Windows logs for WinSAT's secret benchmarks. We then picked the results that best showed the difference between the operating systems. Here's what we found.

Most results came back neck-and-neck, except for the Aero and D3D tests. Vista SP1 shows a near 20 per cent reduction of CPU utilisation for Aero, which backs Microsoft's assertion that desktop performance has been improved. Although minor, all D3D operations saw a one to

Crytek's *Crysis* provides resilient benchmarking for both Direct3D 9 and 10.



WinSAT CPU	
SP1 - ZIP compression (MB/s)	305.15
Vista - ZIP compression (MB/s)	306.04
SP1 - DirectShow encoding (secs)	2.68
Vista - DirectShow encoding (secs)	2.64
WinSAT memory	
SP1 - Mean speed	5,954,711
Vista - Mean speed	5,951,581
Per cent	
SP1 - CPU idle time	74.41
Vista - CPU idle time	53.04

WinSAT Direct3D	Frames per second
SP1 - Alpha blending - Speed	208.95
Vista - Alpha blending - Speed	192.96
SP1 - Texture loading - Speed	505.61
Vista - Texture loading - Speed	484.69
SP1 - Shader ALU - Speed	465.53
Vista - Shader ALU - Speed	461.7

four per cent improvement. It's a shame this wasn't reflected in our gaming test (see 'Games we play').

Direct3D 10.1: What's in the point-one?

We mentioned earlier that while Direct3D 10.1 is included in Vista Service Pack 1, you're not going to see it any time soon. This has nothing to do with Microsoft - SP1 has D3D 10.1 - it's just there's no hardware or games that support the extended API.

It's important to note SP1 comes with *Direct3D 10.1*, not *DirectX 10.1*. Like every revision of DirectX since 7, the focus is graphics.

When Microsoft introduced Windows Vista and Direct3D 10, it stated that the operating system would no longer allow video cards with mixed capabilities - you either supported D3D 10 or you didn't. While taking away control from vendors such as NVIDIA and AMD, it made upgrading a simpler proposition for consumers.

Things didn't work out this way, of course. With the mention of D3D 10.1 in SP1, and the news that current-gen hardware does not support it, people are upset that their shiny GeForce 8s and Radeon 9s are suddenly obsolete.

They're not. So stop panicking. You will have to upgrade eventually when

Assessment
Windows Vista performs a detailed assessment of your computer's capabilities. It then assigns your computer an opaque rating based on these benchmarks. TweakVista shows you the detailed information these assessments are based on.

Sunday April 22, 2007 7:30:41pm - 3.00 GHz - 2,046 MB - 7.15.11.6925 (NVIDIA GeForce 8800 GT)

Overview	CPU	Memory	Graphics & Display	Direct3D	Disk drive
Capabilities					
Supports Direct3D 9 (or better): Yes					
Vertex shader profile: vs_3_0					
Pixel shader profile: ps_3_0					
Supports pixel shader 2.x: Yes					
Supports pixel shader 3.x: Yes					
Texture loading test					
Speed: 484.69 FPS					
Effective speed: 352.51 FPS					
Duration: 4.96 sec					
CPU idle time: 73.00%					
Frames rendered: 2405					
Average frame time: 2.06 ms					
Standard deviation frame time: 0.31 ms					
Alpha blending test					
Speed: 192.96 FPS					
Effective speed: 142.91 FPS					
Duration: 5.01 sec					
CPU idle time: 74.00%					
Frames rendered: 966					
Average frame time: 5.18 ms					
Standard deviation frame time: 1.18 ms					
Shader ALU test					
Speed: 461.70 FPS					
Effective speed: 307.12 FPS					
Duration: 4.95 sec					
CPU idle time: 67.00%					
Frames rendered: 2284					
Average frame time: 2.17 ms					
Standard deviation frame time: 0.31 ms					

What does Vista itself think of Service Pack 1?

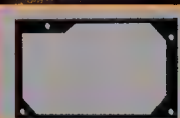
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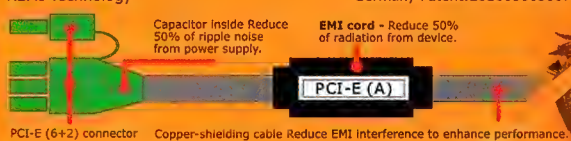
Tagan U33
Power Supplies



For those who build their own PCs, knows quality power supplies. NVIDIA and ATI certified with 6 or 8 pin PCI-E power cable options, the new Tagan 2 Force II Series are available from 400 watt to 900 watts and boasts 12v rail configuration often found in more top end PSUs. The Tagan 2 Force II series operates under the Tagan Silence Control Technology so you wouldn't even know it was there!

REMI Technology

Germany Patent: 202005005007

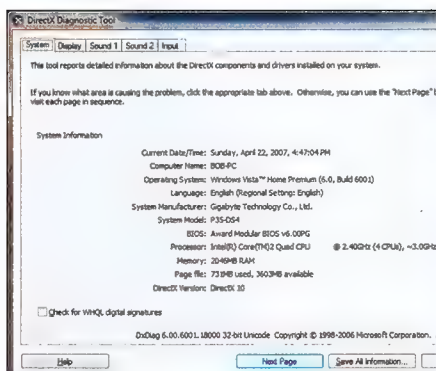


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DXDiag reports DirectX 10 in Vista SP1.
Where's my 10.1?

Direct3D 11 arrives, but MS has yet to announce a release date. Remember, Direct3D 10 was an API for developers, not gamers. D3D 10.1 is no different, giving devs more control over antialiasing and other features. For us? You're not going to notice the difference.

Should I or shouldn't I?

It would be nice to say you have a choice in the matter. But you don't. If you want to keep running Vista you can only put off Service Pack 1 for so long. Eventually, security and performance updates will have SP1 as a prerequisite, and before you know it, you'll be cueing that 450MB file for download.

Our recommendation is to back up your important files, grab vLite (see 'Why Vista SP1 Hates vLite') and create a customised, lightweight build of the operating system using the integrated Vista SP1 as a base. Install it and get the headache out of the way now. Look at it this way – you won't have to go hunting down all those hotfixes, as Microsoft has rolled them up into one easily accessible package for you.

If you're looking for more definitive reasons to

WHY VISTA SP1 HATES VLITE

Unfortunately for those of us that went to the trouble of putting together a customised version of Vista, Microsoft has rewarded us by making many of the component updates in Service Pack 1 compulsory. What this means is if you've removed one of these components using a program such as vLite, the Service Pack 1 update will fail with the error code '0x80070002'.

You can, however, create your own integrated Service Pack 1 install using the latest version of vLite (1.1.6 RC). There's a guide up at the program's official website: www.vlite.net/help/slipstream.html. It's not overly complicated, but it does add some additional steps to your slipstreaming process.

The best option is to grab the integrated Vista SP1 image and use that as the basis for your install. That's if you can get your hands on it...

HOT HOTFIXES

Vista SP1 is packed with hotfixes. Lots and lots of hotfixes. But not all of them apply to us. In fact, many of them are for esoteric configurations you're unlikely to encounter. So, we've cherry-picked the hotfixes that are likely to affect us and replicated the info here.

- 925528** Stop errors occur on a Windows-based computer that has 2GB or more of RAM and is using an NVIDIA nForce USB controller.
- 929427** The Windows Vista Application Compatibility Update.
- 929777** Error message when you try to install Windows Vista on a computer that uses more than 3 GB of RAM: "STOP 0x0000000A".
- 931770** The copy process may stop responding when you try to copy files from a server on a network to a Windows Vista-based computer.
- 932246** March 2007 Windows Vista Application Compatibility Update.
- 932539** The screen may go blank when you try to upgrade the video driver on a Windows Vista-based computer.
- 932653** The pointer for a high performance mouse does not move correctly in Windows Vista.
- 933590** The Flight Simulator X game display flickers and becomes corrupted on a Windows Vista-based computer that is connected to more than one monitor.
- 935280** July 2007 Windows Vista Application Compatibility Update.
- 935427** When you transfer a file between a Windows Vista-based client computer and a file server, Windows Vista stops responding.
- 936357** A microcode reliability update is available that improves the reliability of systems that use Intel processors.
- 936613** The performance of gaming graphics may be less than you expect, based on the Windows Experience Index score in Windows Vista.
- 936710** When a DirectX 10 application runs on a Windows Vista-based computer that has multiple graphics cards, the computer does not use the secondary graphics card.
- 937500** A Windows Vista-based computer that uses a PCI-E graphics device may stop responding when you wake the computer from sleep.
- 938194** An update is available that improves the compatibility and reliability of Windows Vista.
- 938838** Windows Vista displays the incorrect dedicated video memory size for certain display adapters.
- 938979** An update is available that improves the performance and reliability of Windows Vista.
- 939423** The Windows Aero feature may be disabled when you have a graphics card that uses system memory to augment dedicated video memory on a Windows Vista-based computer.
- 940105** Virtual address space usage in Windows game development.
- 941568** MS07-064: Vulnerabilities in DirectX could allow remote code execution.
- 941649** An update is available that improves the compatibility, reliability, and stability of Windows Vista.
- 942869** The read speed of the DVD-R/RW drive is much slower than the expected speed on a Windows Vista-based computer.
- 942917** The Direct3D (D3D) application stops rendering graphics on a Windows Vista-based computer when you switch from integrated graphics to discrete graphics.
- 943302** December 2007 Windows Vista Application Compatibility Update.
- 943899** An update that improves the performance, responsiveness, and reliability of Windows Vista is available.
- 945149** Graphics performance can be improved in certain multiple-GPU scenarios on a Windows Vista-based computer.
- 945680** A USB keyboard does not work after you restart a Windows Vista-based computer that has an NVIDIA 680i motherboard installed.

upgrade, it's hard to provide an argument. *Crysis* showed little improvement, even a performance decrease, with SP1 installed. File copy times for multiple files has improved, but at the apparent expense of single file copy operations. Vista's initial install footprint is considerably smaller, and this is a great reason to get it on your PC, if only to recover 4GB of space. Direct3D 10.1 is no reason to grab

it as you won't be using it in the near future. Most users running a vLite-version of Vista won't even be able to install SP1 and if you're PC still has Windows XP, SP1 is not going to be the reason you upgrade – assuming you're even interested.

The best way to look at SP1 is the first step towards SP2, which will hopefully make Vista an even more compelling proposition.

12% Faster!

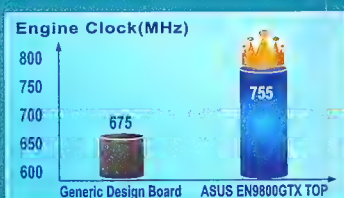
3-Way SLI Support for Extreme Gaming Graphics! **ASUS EN9800GTX TOP**



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Overclock the Shader Clock with New Smart Doctor

ASUS garners a world's first with SmartDoctor, which provides overclocking for the Shader Clock on GPUs independently from the Engine Clock-delivering astonishing performance boosts without the hassles of rebooting or re-flashing the BIOS.



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HARDCORE

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NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

We're turning over a new leaf this month in the labs, as we migrate our testbed from 32bit Vista to a 64bit version of the OS. It makes our testing a little bit easier and more reliable from bench to bench, plus – since we believe 64bit is truly the way of the future – it puts us nicely ahead of the curve.

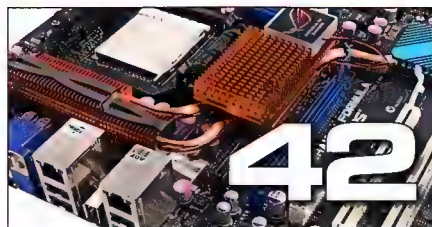
OS shenanigans aside, Josh has gone absolutely insane this month – cooling mad, as it were. He's been shivering in the intense breeze caused by nearly two dozen fans and heatsinks, which we've gather for your testing pleasure this month. While, from the outset, we always thought cooling to be interesting enough to warrant the test, we were surprised at the level of variance on offer. If you're

serious about keeping your PC cool and running smooth, this is essential reading.

Also essential is our continuing look at NVIDIA's 9-series of cards, especially the 9800 GX2. We're just not sure the new series justifies the seemingly generational leap that NVIDIA's claiming. Read on for more.

But that's not the only hardware string to our bow this month, as we've got some very interesting low powered, integrated-graphics motherboards in the bag, some RAM kits, a couple of complete systems, and another soundcard review from Jake Carrol.

Fan on!



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WIN TICKETS TO A PRIVATE, ATOMIC ONLY SCREENING OF THE NEW FILM *MONGOL*..

Here at Atomic, we like to throw the odd party. So when the good people from Hopscotch films asked us if we'd like to invite our readers to a special screening of the movie *Mongol*, before it was released in cinemas, we said "heck yeah".

Mongol is the story of Genghis Khan, a man remembered as a merciless and fearless warrior who once ruled an empire that spanned half the globe.

For more info, go to: www.mongolmovie.com
In Cinemas June 19th.

To be in with a chance go to www.atomicmpc.com.au/competitions

GEARBOX

All the best and coolest gadgets and gear!



◀ EMT Wireless Paintball Sentry Turret

Price \$US1959 Website www.evolutionmodeltechnology.com

There's a great scene in the *Aliens Special Edition* where Corporal Hicks and the other survivors of the ill-fated mission to LV426 watch the ammunition counters tick down on a pair of sentry guns, as hordes of aliens throw themselves at the wall of lead. Getting hold of the aliens is still going to be hard, but modern technology now at least allows us to use the sentry guns – paintball-powered sentry guns at that!

Atomic HQ is not averse to the odd round of paint splattered fun, so when the EMT Wireless Turret crossed our digital desk, we nearly wet ourselves with joy. This remote paint weapon features a dual-barrel marker, 400 round hopper, and can be upgraded to night vision, zoom scopes, thermal imaging and virtual 50in LCD TV glasses. Hell, we'd even be happy to use this to keep the Atomic Labs safe and secure.

The Sanctuary ▶

Price \$129.95 Website TBA

Every now and then you come across a small, innocuous item that may not seem at all important or useful – until you actually think about how damn useful it is, and suddenly it seems just the coolest thing ever, something you can't imagine living without.

The Sanctuary is kinda like that. Some of us Atomicans – and I'm naming no names here – tend towards a rather messy desk environment, and this is a handy solution to keep your important personal tech, like phones and mp3 players, out of the tide of useless paper and bumpf. It can even accommodate power cords so your carefully stowed gear can get its juices recharged.

It's not the best invention ever, but wouldn't your desk be better with one?



Thermaltake BlacX SE HDD dock ▶

Price \$TBC Website <http://thermaltakeusa.com>

We looked at a similar solution to this a few issues ago, but this new effort is a lot slicker, and features some handy extras. As we said last time, there's certainly a lot of spare drives floating about our desks, and we suspect that's a pretty wide-spread Atomican problem.

Easy to use drive docks are then an elegant solution, and this effort from Thermaltake is one of the most elegant so far. Not only does it sport glossy black good looks, but the round base also features a four-port USB 2.0 hub, making the unit doubly useful. It can handle both 2.5in and 3.5in drives, has a special latch on the SATA socket to make removing drives safe and easy, plus it's Windows and Mac compatible. We like!



◀ Remote Control Beverage Buggy

Price \$79.95 Website www.gadgetking.com.au

Since the dawn of time humanity has yearned for one thing – beer that comes to you. As a species we are tired of going to where the beer is; the pub's too far and too crowded, the bottleshop has a scary guy behind the counter and always smells of stale whisky, and your uncle's homebrew, while plentiful, has the nasty side-effect of blindness.

Worry no more, anti-social beer drinker, the Remote Control Beverage Buggy is here.

It's got a powerful-enough engine to be able to haul your beverage of choice fast, bumpers for those who might be controlling under the influence, and racing stripes.





◀ Creative HQ-1900 headphones

Price \$49.95 Website www.au.creative.com/

More often than not when we look at headphones, we focus on the gaming side of sound. This time, though, it's pure music, with this latest set of headphones from Creative.

Which isn't to say the HQ-1900s can't make a good effort at making explosions and atmospheric audio sound great, but they are built more with the DJ in mind.

Offering 30mm Neodymium magnet drivers, folding form factor for easy transport and comfortable velvet earpads, the HQ-1900 hits pretty much every button from sound reproduction to convenience. They also look pretty stylin', which certainly can't hurt.

Gizmobies ▼

Price \$19.95 Website www.varietytoys.com.au

Some times in the pages of Atomic, and especially here in Gearbox, we like to include great toys, cool products, and downright useful stuff.

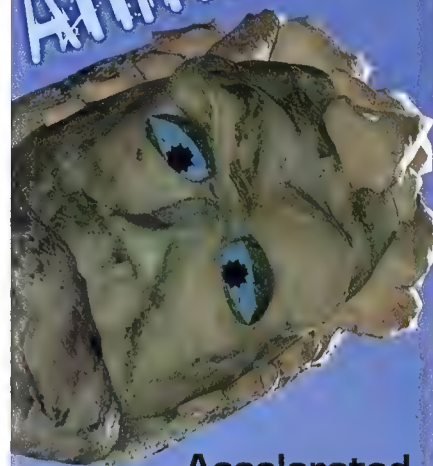
Then there are other times, like this one, where we simply take the chance to show off a lovely set of lips, which just happen to be on an iPod cover called a Gizmobie. Odd name, but the covers are kinda neat – they protect your musical pal and come in a range of styles and patterns for all modern iPods. But we like the lips.



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COOL AND THE GANG

Josh Collins takes a close look at the world of heatsinks and cooling fans; without cutting himself on any!

Nowadays every piece of electron-passing-silicon needs a heatsink to keep the micro-furnaces in check. While the average Joe is content with a stock cooler, we, as enthusiasts know better than to stick with stock. We know that our little silicon buddies will not only live longer but have greater

potential to work faster for us if given some TLC – temperature lowering care.

So this month, we've collected a bunch of copper and aluminium heaps threaded together with heatpipes to find out just which one deserves not only your hard earned moolah but the proud position of mounting upon your silicon love.



Testing Methodology

Test system:

Intel Core 2 Extreme QX6850 G0 stepping @ 3GHz
 EVGA 680i SLI motherboard
 Corsair Dominator PC2-10000 C5 memory
 ASUS 8800GTX graphics card
 Vista Ultimate 64-bit operating system
 Arctic Silver AS5 thermal interface paste

Temperature recording methods:

Software:

Temperature reading: CoreTemp 0.97.1
 Load simulation: Prime95 v25.6
 Hardware: K-Type Digital Thermometer

Testing heatsinks is an interesting and often more complex procedure than you might think. There are sizeable variables such as ambient temperatures, probe accuracy, overall area air flow and actual air flow designs. With all things considered, there comes a point where decisions need to be made and compromises set to ensure as level a playing field as possible while maintaining the head-to-head nature of the testing.

For these reasons we chose to do all of our testing in our emptied out warehouse, rather than the usual labs area. The reason? The labs, even when cooled and with fans blasting, can still have fluctuating temperatures; this especially happens when testing multiple pieces of kit. As we test systems in parallel, it's important that the presence of one test bed doesn't influence any other temperature-sensitive test beds.

For our testing we'll be using a 65nm Intel quad core processor, as we believe this to be the best indication of the cooling capacity of current coolers in the majority of enthusiast systems. The system is set to run with the CPU at 3GHz and with a set vcore of 1.30v.

The temperatures have been recorded using two methods. One is software-based and utilises a widely used enthusiast temperature monitoring program; this of course is CoreTemp. To ensure accuracy from this program in our Vista testing environment (yeah, we still shudder at using Vista), we're using v0.97.1, which is the most recent release at the time of testing. The second method

34.72 CFM VS 59 M³/H - WTF?

One of the biggest issues in today's global economy is the choice of standard measurements. For the enthusiast, this affects us when trying to decipher which fan is better than another. There are fan manufacturers all over the globe; some come from metric-based nations and others from imperial-based nations when it comes to measurement.

As a result, we can often find competing products using completely different units. This, unsurprisingly, can make the uninformed enthusiast consumer rather confused. No longer!

To convert the meters cubed per hour (m³/h) value into cubic feet per minute (CFM), you need to firstly convert the metric value into the imperial, or vice versa. After having done this, it is then easy to deal with the different time values by either multiplying the minute value by 60 for the hour value or dividing the hour value by 60 for the number of minutes. Here are some examples:

m³/h into CFM

First, an understanding of the metric and imperial values that influence the problem

1 meter = 3.28084 ft
 1m³ = 3.28084 x 3.28084 x 3.28084
 3.28084³ = 35.31 cubic feet

So 1m³ = 35.31 ft³

Therefore you need to multiply your meter (m) value by 35.31 to obtain your CF/ft³.

Once done, you're still looking at hours, so divide your CF value by 60 to obtain the minutes to finish off your CFM value.

example:

To convert 59m³/h:

59 x 35.31 = 2083.29 CF/h
 2083.29 / 60 = 34.72 CFM

CFM into m³/h

Now it's time to do it in the other direction, from CFM into m³/h.

First, take the CFM and divide it by 35.31 – that's the number of cubic feet in 1m³.

34.72 / 35.31 = 0.98 (m³/min)

Then convert into hours by multiplying by 60 (the number of minutes in an hour).

0.98 x 60 = 59 m³/h

Note: Values may be out by a few decimal places however this is due to inconsistencies in the conversion due to decimal repeaters and rounding off.

THANKS TO PC CASE GEAR

www.pccasegear.com

We'd like to take this opportunity to say thanks to our friends at PC Case Gear for giving their support to Atomic to conduct such a roundup.

Cheers to the PCCG crew; if you're wanting to check out some innovative ways to not only cool your CPU but also your GPU, motherboard chipset and case airflow in general, take a trip to their website and have a squiz.

of temperature recording is a hardware-based solution. For this, we're using a temperature monitor paired with a K-type probe. These probes have a very wide reading range, from well below freezing through to well above 100°C. To give some perspective, these are the same probes we use, and rely on, when using phase change, dry ice and liquid nitrogen-based cooling solutions.

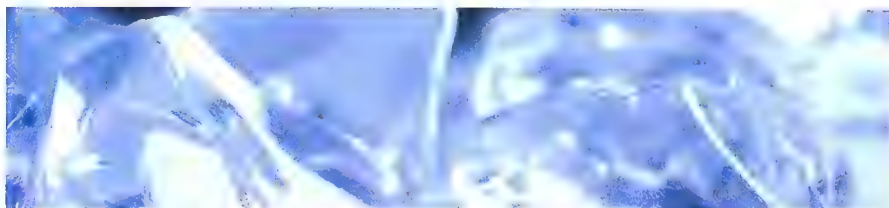
We'll be collecting two sets of results – an idle and load temperature. The idle temperature is obtained by recording temperature readings five minutes after the initial booting of the system and while no programs are running. For the load

temperature result we used Prime95 v25.6 and left it running for 20 minutes, at which point we recorded temperatures with the system under load.

For the testing of the fans in this roundup, we've chosen to use the Thermalright Ultra 120 Extreme as our standard heatsink. The reason for this choice is to represent the choice of the greater majority of enthusiasts and to provide a standard heatsink for testing purposes and result reliability.

The test bed for the fan testing is identical to the system used for the heatsink testing and uses the same methodology and procedures.

Now, on with the results!



Noctua NH-U12P

Price **\$85.00**; Dimensions **158 x 126 x 71 mm (H x W x D; without fan)**, **158 x 126 x 95 mm (H x W x D; with fan)**; Number of heatpipes **four**; Weight **600g (without fan)**, **770g (with fan)**; Material **Copper (base and heatpipes)**, **aluminium (fins)**, **soldered joints**, **nickel plated base/heatpipes**; Fan CFM **54.32** Fan Noise **19.8 dB(A)**; Fan RPM **1300**; Socket compatibility **Sockets 775, 939, 754, AM2, AM2+ and Xeon upon request**; Warranty **six years**

While another maker and model may have the performance crown, it unfortunately lacks the value or 'bang for your buck' crown. This crown of food stamps linked together goes instead to the Austrians behind Noctua. Although the NH-U12P doesn't have a very catchy name, it does have an attractive price point. While still in the premium sector at \$85, the package as a whole is a lot more complete and offers better value to the end user.

Only half a degree behind the TRUE120 in average idle temperature and 1.5°C behind in average load temperature, the heatsink offers a very high standard of performance while maintaining good value for money.

The old saying goes "first the worst, second the best". While first is most definitely not the worst, it certainly isn't the best. We deem the best as not only offering high performance but also strong value and the NH-U12P delivers on both fronts.



HEAD TO HEAD

Thermalright Ultra 120 Extreme

Price **\$74.95 + additional cost for a 120mm fan**; Dimensions **160.5 x 132 x 63.44 mm (H x W x D; without fan)**; Number of heatpipes **six** Weight **790g (without fan)**; Material **not specified; believed to be copper (base and heatpipes)**, **aluminium (fins)**, **soldered joints**, **nickel-plated base/heatpipes**; Fan CFM **N/A - tested with Scythe S-FLEX** Fan Noise **N/A - tested with Scythe S-FLEX**; Fan RPM **N/A - tested with Scythe S-FLEX**; Socket compatibility **Sockets 775, AM2, AM2+ and 939 (additional retention kit necessary)**

It comes as no surprise that in a raw and outright cooling capacity race, the renowned and respected Thermalright Ultra 120 Extreme holds its head up high and retains not only its crown but the glory of being the air cooling king. This is great knowledge for those building the ultimate rig but, as with most high performance products, it comes with a hefty price tag. You see, the Thermalright Ultra 120 Extreme – or TRUE 120 as it's known to the boffins – demands a price tag of \$74.95 and this is without a fan and with limited AM2 socket support. From the lads at PC Case Gear, a bundle is available with a Scythe Kamakaze VR LED fan, but this is a rather staggering \$95 – a hefty premium price for premium performance.

Don't feel bad if you'd rather settle for second best in this situation, the Noctua NH-U12P. It definitely offers better value for your money and near equivalent performance.



Thermalright HR-01-775

Price: **\$69.00**; Dimensions: **159.5 x 110 x 60 mm (H x W x D; without fan)**; Number of heatpipes **four**; Weight **525g (without fan)**; Material **not specified; believed to be Copper (base and heatpipes)**, **aluminium (fins)**, **soldered joints**, **nickel plated base/heatpipes**; Fan CFM **N/A**; Fan Noise **N/A**; Fan RPM **N/A**; Socket compatibility **Sockets 775, 478, AM2, 754, 939 and 940**

This is one heatsink that is certainly interesting to play around with.

With a stack of heatpipes, a mess of aluminium fins and from the respected folks at Thermalright, we wondered whether it really was possible to have a high performance, passively cooled solution.

Well, sadly, the answer to that query is simple. No.

With the quad skipping along at 3GHz, even this relatively mild heat output (considering us enthusiasts tend to run higher overlocks), the HR-01-775 simply couldn't dissipate the heat in time. The only way we can imagine this heatsink being effective is with a case arrangement that creates an effective wind tunnel through the HR-01-775's fins.

This may be a good option for a low voltage, low frequency system but we'd still suggest an actively cooled heatsink of some sort – the chips these days simply put out too much waste heat.



Scythe Ninja Plus

Price **\$69.00**; Dimensions **150 x 110 x 110 mm (H x W x D; without fan)**; Weight **640g (without fan), 770g (with fan)**; Number of heatpipes **six**; Material **Copper (base and heatpipes), aluminium (fins), soldered joints**; Fan CFM **49.58**; Fan Noise **20.94 dB(A)**; Fan RPM **1200**; Socket compatibility **Sockets 775, 478, AM2, 754, 939 and 940**

The Scythe Ninja Plus makes a fair effort at cooling your silicon but when considering its size, number of heatpipes and the large surface area found on the fins, the overall cooling performance ends up leaving a little to be desired.

While similar tower designs from Thermalright and Noctua were able to achieve low 50s and similarly comparative heatsinks from Tuniq and Thermaltake scores in the mid 60s, you've really got to be left wondering what the Ninja Plus is doing (or not doing, as the case may be) in the low 70s.

As the final nail in the coffin, the Ninja Plus is even 0.75°C behind the Noctua NH-U9B in average load temperature. While the difference is very small, the Noctua NH-U9B is much smaller and only costs \$3 more.

The lack of effort from the Ninja Plus, combined with the results from the Ninja Mini, really leaves a sour taste overall in regards to the cooling capability of heatsinks produced by Scythe.



Scythe Ninja Mini

Price **\$59**; Dimensions **115 x 110 x 110 (H x W x D; without fan)**; Number of heatpipes **six**; Weight **580g**; Material **Copper (heatpipes), aluminium (fins), soldered joints, base believed to be nickel plated copper (unable to confirm)**; Fan CFM **32.2**; Fan Noise **24.4 dBA**; Fan RPM **2,300**; Socket compatibility **Sockets 775, 939, AM2, AM2+**

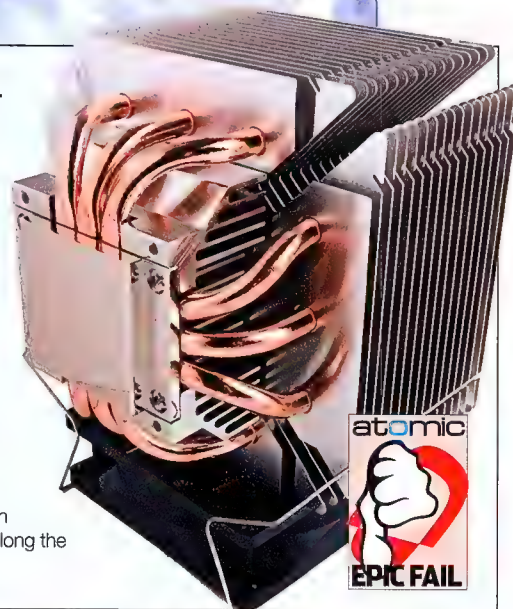
We're just going to get straight to the undeniable truth with this one – it was an utter let down.

It had the potential to be a killer small form-factor cooling solution; delivering a bounty of heatpiped cooling while maintaining a small foot print. However, what we got was a badly crafted and ultimately disappointing thermal solution.

The problems began first with the hold-down mechanism. Scythe has chosen to implement the push pin style of retention as seen with the stock Intel heatsink. It is a solution with well-known faults, the most negative of which being the low pressure retention while requiring high pressure from the user to implement it. This not only makes the user nervous at the installation stage, but temperature control does not meet expectations due to poor contact from low pressure.

And boy, oh boy, is this the poster child for poor contact. We got the samples for this roundup straight from the shelves of PCCG's retail stock. No special samples, nothing direct from the manufacturer but rather the exact end product expected to be received by you guys, the public.

What we received wasn't an effective cooling solution but rather a laughable chunk of copper and aluminium that isn't even flat! The base was so un-flat (it's a technical term - *ed*), so concave, that even when we physically applied pressure downwards onto the heatsink, it was only just making contact along the edges. We heavily advise *anyone* to not buy one of these heatsinks – it's just not worth it.



Thermaltake V1

Price **\$86.00**; Dimensions **143 x 147 x 92 mm (H x W x D)**; Number of heatpipes **six**; Weight **637g**; Material **Copper**; Fan CFM **86.5**; Fan Noise **24 dB(A)**; Fan RPM **1300-2000**; Socket compatibility **Sockets 775, AM2, 939, 754 and 940**

The Thermaltake V1 offers some surprising thermal control, coming in as the fourth fastest on test and only edged out of third by a margin of 1.5°C under load by the Tuniq Tower 120.

Using an unusual heatpipe and fin arrangement, the Thermaltake design is unique in comparison to the majority of tower-like designs from other close competitors such as the Tuniq Tower 120, Thermalright Ultra 120 Extreme and Noctua NH-U12P.

Furthermore, the design leaves the Thermaltake V1 much lighter than the competitors, with the TRUE120 and Tuniq floating around 200g heavier and the Noctua 100g heavier. This could have the potential to lower performance as increased copper/aluminium mass can directly influence an increase in heat dissipating performance. Luckily for the V1, the design is efficient and although lighter than the hulking towers that beat it in performance, it still manages very respectable performance.



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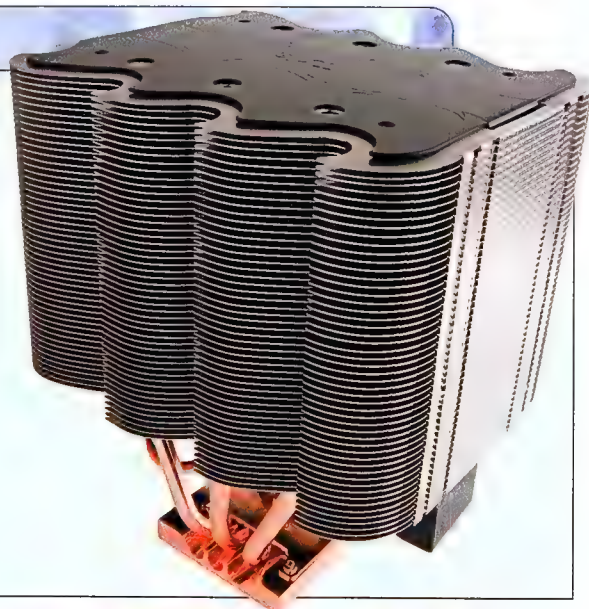
Tuniq Tower 120

Price **\$79**; Dimensions **153 x 131 x 108 mm (H x W x D)**; Number of heatpipes **three**; Weight **798g (without fan)**; Material **Copper (base and heatpipes), aluminium (fins), soldered joints**; Fan CFM **N/A**; Fan Noise **20-34 dB(A)**; Fan RPM **1000-2000**; Socket compatibility **Sockets 775, 478, 939, 754 and 940**

It wasn't that long ago that these heatsinks were in short supply world wide as demand heavily outweighed supply, thanks to their popularity in the overclocking arena.

These days however, the Tuniq Tower 120 has been thrown back amidst the pack, where if you don't have the best performance, finding a unique selling point can be difficult. And this, unfortunately, is exactly where the Tuniq Tower 120 finds itself. It no longer enjoys leading the performance pack, and there's no unique selling point other than the fact it looks kind of cool. When the pressure's on, there are simply better options. At \$79, it's only an extra \$6 to get a Noctua NH-U12P, which offers superior performance and still includes a bundled fan.

The days of the Tuniq Tower 120 have come and gone; now it is just another option to fill the racks.



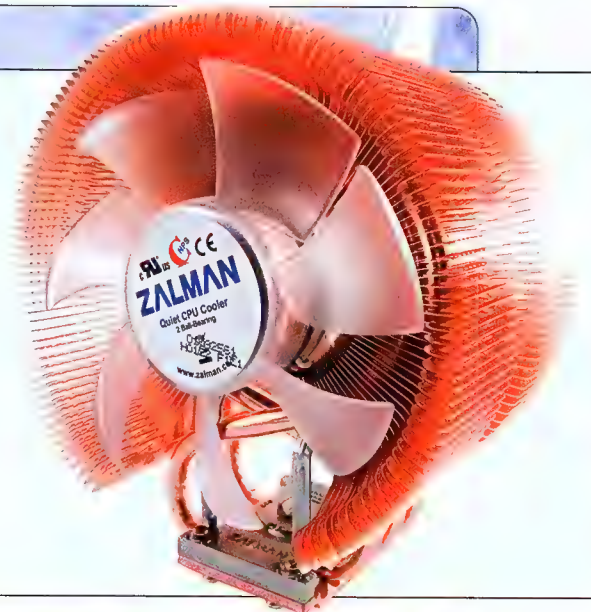
Zalman CNPS-9700

Price: **\$76.00**; Dimensions: **142 x 124 x 90 mm (H x W x D)**; Number of heatpipes: **three - in figure of eight pattern**; Weight: **690g (without fan), 764g (with fan)**; Material: **Copper**; Fan CFM: **N/A**; Fan Noise: **19.5-35 dB(A)**; Fan RPM: **1250-2800**; Socket compatibility: **Sockets 775, 478, AM2, 939, 754 and 940**

The design of the CNPS-9700, while unique, is aging and starting to show it. Coming in at an average weight compared to the competition, though paired with a built in fan, the heatsink simply doesn't offer the same level of performance for today's CPUs as the more common tower-designed heatsinks.

This lack of performance leaves the Zalman CNPS-9700 in a kind of no-man's land. For an extra \$9 you can pick up the Noctua NH-U12P and have class-leading performance and value. If the extra cash is a bit rich for you, you can save money and get the \$72 Noctua NH-U9B and *still* have better performance, albeit only slightly.

The time has come for Zalman to go back to the drawing board. The company is renowned for its thermal solutions, so let's see Zalman join the ranks of the new generation of coolers.



Noctua NH-U9B

Price **\$72.00**; Dimensions **125 x 96 x 70 mm (H x W x D; without fan), 125 x 96 x 95 mm (H x W x D; with fan)**; Number of heatpipes **four**; Weight **460g (without fan), 550g (with fan)**; Material **Copper (base and heatpipes), aluminium (fins), soldered joints, nickel plated based/heatpipes**; Fan CFM **37.84**; Fan Noise **17.6 dB(A)**; Fan RPM **1600**; Socket compatibility **Sockets 775, 939, 754, 940, AM2, AM2+ and Xeon upon request**; Warranty **6 years**

Beating larger coolers such as the Scythe Ninja Plus and the Zalman CNPS-9700, the Noctua NH-U9B proved to be a tough little customer in the performance stakes.

Three dollars more than the Ninja Plus and four dollars less than the CNPS-9700, these coolers float around in the high mid-range sector. Being so close in price makes performance all that more important and although the NH-U9B is only 0.75°C ahead of the Ninja Plus, it offers this performance level in a much smaller and capable form factor. Having this kind of performance in such a relatively small form allows for the NH-U9B to sit confidently both in an enthusiast gaming system or a quiet home theatre PC.

Sealing the deal with a six year warranty, it's the final cherry on the top for a very sweet deal.

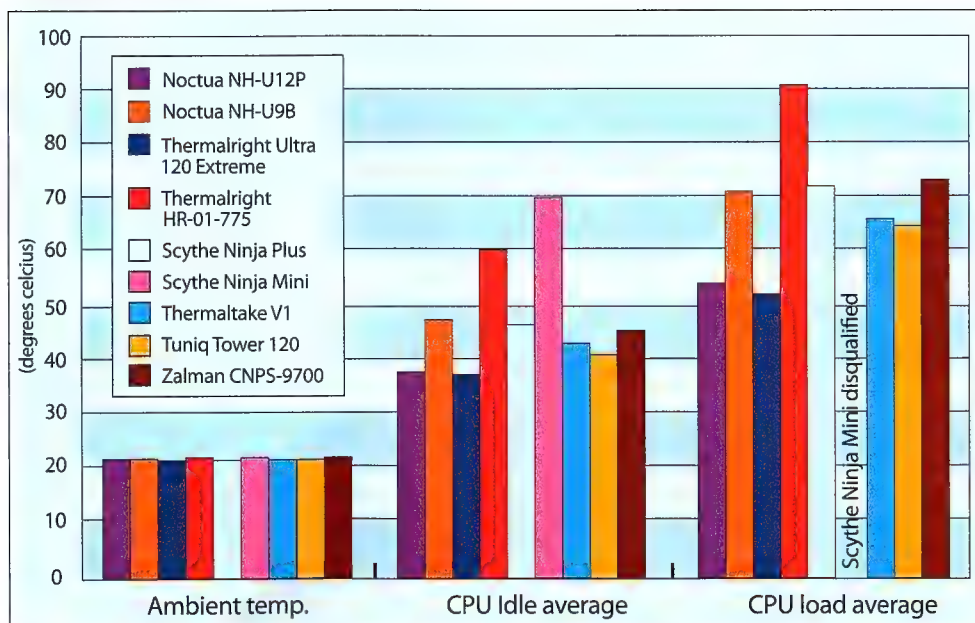


AM2 AND AM2+ COMPATIBILITY CLARIFICATION

There's a little confusion amongst those in the AMD camp as to what heatsinks are compatible with what sockets and what chips. The very large majority of this confusion comes from AM2 and AM2+ - two different sockets sharing the same space.

So, as a moment of clarity for all to enjoy, the AM2 and AM2+ socket are, when talking in terms of heatsink retention, physically the same. This means that a heatsink that touts AM2 support will also function on an AM2+ based system.

Heatsinks



Fans

Nexus Real Silent 120mm

RPM **1000**; CFM **36.87**; dB(A) **22.8**; Number of blades **seven**; Dimensions **120 x 120 x 25 mm**; Price **\$17.40 @ PCCG while on special, normally \$29**

A past favourite of many quiet-computing enthusiasts, the Nexus Real Silent 120mm comes in both orange and the black/white colour tested in this roundup.

It's got some age behind it but the Nexus Real Silent 120mm still manages to provide an adequate level of performance. It matched the Scythe S-FLEX for idle CPU temperature and is only 2.5°C behind it in CPU load temperature.

At a bargain of \$17.40 from PCCG, it's a good option for those wanting higher performance but not ready to split with the necessary dollars.



Silverstone Suscool 121

RPM **400 - 950**; CFM **17.75 - 42.15**; dB(A) **15 - 18**; Number of blades **nine**; Dimensions **120 x 120 x 25 mm**; Price **\$17.50**

Whirling around with a decent idle CPU temperature, the Suscool failed to really kick into gear effectively enough to offer a strong air flow to flush out the heat from the TRUE120. As a result of this, the load CPU temperature was the worst of the lot.

It started well, but just couldn't maintain a similar level of performance for the whole race.

The Suscool comes in neat colours that could offer some good contrast for a case mod but whether you're after quiet cooling or strong performance; these aren't the fans for the serious enthusiast.



Scythe S-FLEX 120 SFF21E

RPM **1200**; CFM **49**; dB(A) **20.1**; Number of blades **seven**; Dimensions **120 x 120 x 25 mm**; Price: **\$25**;

The best of the 25mm thick fans for use with the Thermalright Ultra 120 Extreme (TRUE120), the Scythe S-FLEX further cements itself as a high quality fan for the enthusiast market - lucky it didn't take after the company's heatsinks!

The S-FLEX incorporates the S-FDB (fluid dynamic bearing by Sony Corporation) and this is one of the main attributes to the quiet running of this fan. Paired with other noise minimising technologies, the S-FLEX aims to offer a powerful CFM without sacrificing the user's hearing and piece of mind.



Scythe Kama PWM

RPM **310 - 1200**; CFM **12.38 - 52.71**; dB(A) **0 - 24.98**;
Number of blades **seven**; Dimensions **120 x 120 x 25 mm**; Price: **\$22**

Like some of the other PWM fans in this roundup, the Scythe Kama PWM let the idle CPU temp go a little bit too much and as a result the load CPU temp floated up between 57°C and 58°C before settling in the middle at 57.5°C. While a PWM can be good for a quiet system, as long as there are fans such as the S-FLEX and Noctua NF-P12 on the market, be it for a heatsink or as a case fan, the necessity for PWM fans just doesn't seem to be apparent.

Oh, and by the way, don't bother considering this fan seriously for a heatsink that uses metal clips as the fan's chassis does not allow for the clips to fold in correctly - screws only for this baby.



Scythe Ultra Kaze

RPM **2000**; CFM **87.63**; dB(A) **32.91**; Number of blades **seven**;
Dimensions **120 x 120 x 38 mm**; Price **\$21.50**

The first of the 38mm thick fans, the Ultra Kaze presents the calmer end of the spectrum.

There are actually three different models of the Ultra Kaze, one rated for 1000rpm, another for 2000rpm, and the mac-daddy rated for 3000rpm. All three versions have the same asking price from the lads at PCCG.

We didn't want to be placid nor did we want crazy - we already had the Delta and Sunon after all - so we opted for the 2000rpm model.

After testing, we were pretty happy we did so. At 2000rpm the Ultra Kaze offers similar performance to the Delta and Sunon but at a much lower volume. Low enough in fact, for us to consider it for a 24/7 solution as long as you were happy to have speakers or headphones with music flowing for the majority of the time.



Delta 120mm Ultimate High Speed TFB1212GHE

RPM: **4600**; CFM: **220.01** dB(A): **65**; Number of blades: **nine on main rotor, 13 blades built into rear of frame**; Dimensions: **120 x 120 x 38 mm**; Price: **\$39.90**

OMNOMNOMNOM!

This is the only thought that could possibly go through your mind that is not associated with fear as you first witness this beast of a fan spin up and start the gale force torrent of air that follows. The sound and air blasting insanity of this fan has even earned it the title of Organ Grinder around the Atomic office.

This is a fan for the insane, the overclockers and the deaf. Use at your own risk and enjoy the powerful air cooling provided by this weighty, chunky and ultimately devastating fan.



Sunon 120mm KD1212PMB1-6A

RPM **3100**; CFM **108**; dB(A) **42**; Number of blades **five**;
Dimensions **120 x 120 x 38 mm**; Price **\$22**

The final sample of the 38mm thick offerings and it sits snugly between the acceptable Ultra Kaze and Delta organ grinder. The Sunon gives that tiny bit more cooling performance but, while doing so, gives noticeable extra noise. While it could be argued that it can be volt-modded down to ease the acoustic hit, by the same token you could just get the Ultra Kaze in the first place.

The Sunon is a cool fan (ouch, yup, we had to go there at least once), but it doesn't quite cut the mustard in terms of finding an open market. The organ grinder... well it grinds organs, while the Ultra Kaze offers the super-charged performance while doing so in an acceptable noise envelope.



Arctic Cooling 120mm AF12025 PWM

RPM **400 - 1500**; CFM **56.3** dB(A) **10.5 - 24.5**; Number of blades **seven**;
Dimensions **120 x 120 x 25 mm**; Price **\$15.90**

Another oldie and it's feeling the years. Sitting just a quarter of a degree from last at idle and half a degree from last under load, the old AF12025 PWM is no longer in touch with today's high air flow heatsink designs. Put this fan on a heatsink such as the Noctua NH-U12P and it would likely do better; but then, with a heatsink like that, the best fan for the design is already bundled with it.

While no longer a contender for heatsink glory, the AF12025 PWM is still a solid performing and cost efficient option as a mere case fan, however.



Arctic Cooling Arctic Fan 12 PWM

RPM **400 - 1500**; CFM **56.3**; dB(A) **10 - 23.5**
 Number of blades **seven**; Dimensions **120 x 120 x 38.5 mm**; Price **\$15.90**

On paper, the Arctic Fan 12 PWM and the AF12025 are near identical. But this is a good case of same-same on paper and very different in the flesh... well, plastic in this case.

The Arctic Fan 12 PWM is designed as an exhaust fan and as such the front part of the fan enclosure has been removed and the rotor and blades protrude out from the base/rear of the fan.

This substantially limits the implementation of the fan. One thing is for sure, this fan is not appropriate for the vast majority of tower heatsinks that utilise metal clips to keep the fan in place. We managed to implement it on the TRUE120 with some trickery but it is by no means a 24/7 solution.

Having been excluded from the majority of heatsinks by design, the fan can only truly operate as a case fan, even then there are other more versatile options due to the exhaust only design.



HEAD TO HEAD

Antec TriCool

RPM: **three speeds available - RPM of all not specified**; CFM: **39 - 79**;
 dB(A): **25 - 30**; Number of blades: **seven**; Dimensions: **120 x 120 x 25 mm**; Price: **\$29**

Tested with the speed selector set to high, the Antec TriCool was a surprising success and proved to be a welcomed partner for the TRUE120. The Antec TriCool was also the only fan in the roundup with some bling. It's currently available in blue, green and red.

Ours was red - it goes faster.

Ten cents short of thirty smackers, even with the surprising strong performance taken into consideration, we'd still prefer options such as the Scythe S-FLEX and Ultra Kaze - while its heatsinks tested as shockers, the company appears to have the fans sorted.

The only reason to really go for the Antec TriCool is for the lighting effect, but at least we know that unlike most ricers, this glowing spectacle still has what it takes in the performance stakes.



Noctua NF-P12

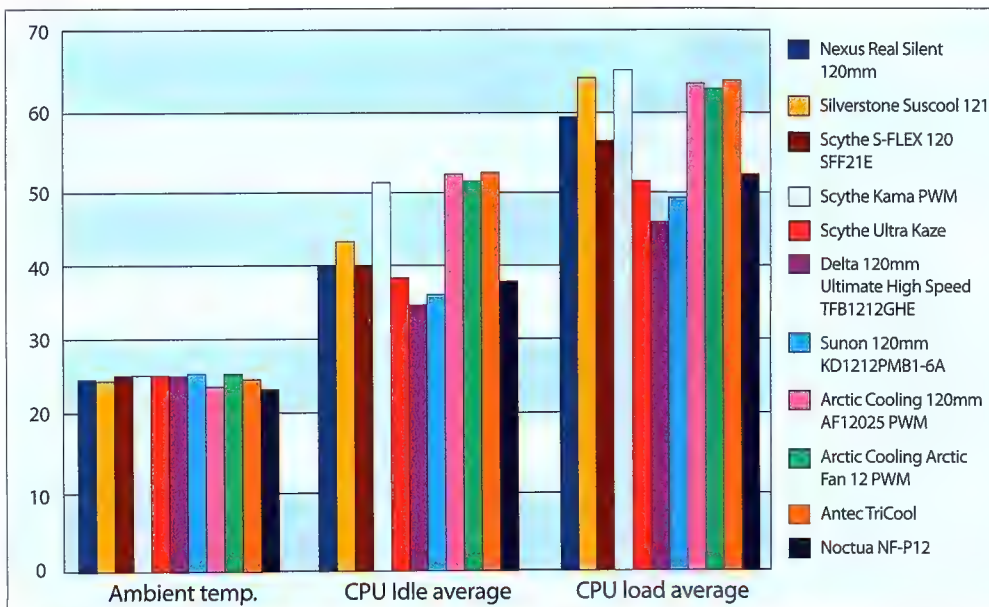
RPM **900 - 1300**; CFM **54.31 (max)**; dB(A) **19.8**; Number of blades **nine**;
 Dimensions **120 x 120 x 25 mm**; Price **\$29.90**

It is evident that this fan, like the majority of lower RPM solutions, has found a performance slump on the design of the Thermalright Ultra 120 Extreme. Quite literally from second to none, the NF-P12 loses all it gained from the direct head-to-head of the heatsinks when paired with a heatsink with densely populated fins.

Still, it's a welcome change to the ears when compared to the majority of other fans. The NF-12P is best left to the Noctua NH-U12P and other heatsinks with a sparsely laid out fin array and as a quiet case fan, it's not a winner for the TRUE120.



Fans



FINAL NOTE

Please note that the testing found here is specific to the Thermalright Ultra 120 Extreme and therefore the design it implements. Some fans will see lower than normal cooling performance for as simple a reason as being outside the spectrum it was designed for.

This collection of fans has been rated on performance when paired with a TRUE120 and therefore reflects most accurately on high-flow heatsink designs and should only be used as a guide for other heatsink designs such as the lower flow NH-U12P.

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It wasn't too long ago that we saw the launch of the 7-series flagship 790FX chipset from AMD break into the market with the first AM2+ chipset. Now with the 770, 790X and 790FX in place, AMD is adding another 7-series chipset to the list. The new release is the much awaited AMD 780G. This chipset features the 780G north bridge and SB700 south bridge.

The GIGABYTE GA-MA780GM-S2H

motherboard is one of the first mobos to market featuring the new chipset – AMD is even using it for the press release packs. So, with this in mind, we figured this board would be as good a point as any to take the first look at what the new platform can do.

The SB700 south bridge can support up to six SATA devices, one EIDE port and one floppy port. The RAID functions available for the SATA ports are RAID 1 and RAID 0. Interestingly, GIGABYTE has chosen to only provide five of the six ports internally, with the last port being an eSATA connection on the back I/O panel.

While the SB700 is a step up from the SB600 found paired with the 790FX north bridge, the big news in this release is the 780G north bridge. This implements an integrated graphics processor (IGP) – this is where things begin to get interesting with this platform.

The IGP utilises the 55nm RV610 graphics processor and shares 256MB of the system memory. This chip is more commonly found in the HD2400 graphics card. In the 780G solution, the RV610 is represented as a HD3200 and the core code name changed to RS780. From our testing, we found the chip to rather successfully shift from a low-end discrete card to an integrated GPU. We found the HD3200 to offer some great

value for money – especially considering it has been incorporated into a \$100 motherboard!

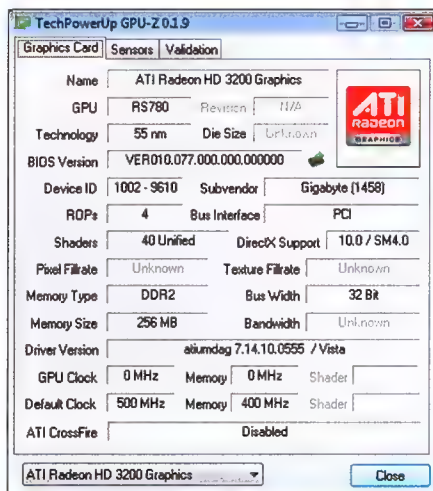
During our tests, the HD3200 integrated graphics processor successfully ran *Crysis*, albeit at a snails pace, with an average, minimum and maximum FPS of 12.39, 0.00 and 17.60. While the return of 0.00 FPS indicates a complete loss of frames, the fact this pint-sized punter can even run *Crysis* is quite amazing. Not only that, it managed to pull through 3DMark06 with an understandable 1159 3DMarks.

While it's no HD3870 X2, this IGP can certainly be proud of what it is and could be used as a low-end solution for games such as the ever-popular *Counter Strike: Source* while adding its own bit to the action in a Hybrid CrossFire solution. But gaming isn't the only focus of this IGP. Well, to be honest, it's not really a focus; it's more a by product.

What this platform truly excels at is providing a basis for a low cost but in-class high performance media center. To test this theory we paired it with an Athlon X2 4850e throughout our testing. This 45W TDP low power chip is its perfect partner.

During playback of full 1080p content, the maximum CPU utilisation seen was just 40 per cent. The reason for this non-CPU-thrashing behaviour is the ability of the RV610 (or RS780, whichever name you wish to use) to decode the 1080p content – effectively reducing the amount of processing to be done by the CPU.

It's no secret that AMD has been struggling with the high-end enthusiast sector and even the mid-range sector, but this low-cost and highly functional platform could very well turn into a bread and butter winner for AMD.



Athlon X2 4850e		200x12.5; DDR2-716 5-5-5-18-24 2T (SPD defined); HD3200 IGP
Super Pi 4M		3m 08.604s
wPrime 32M		31.075s
Hexus Pi Fast		52.96s
3DMark06		1159
Crysis	Average	12.39
	Minimum	0.00
	Maximum	17.60
CineBench R10 64-bit – single thread		2223
CineBench R10 64-bit – multi-thread		4272
Everest Read		5101MB/s
Everest Write		5063MB/s
Everest Latency		59.9ns

SCORE **8.5** OUT OF 10

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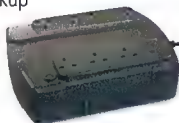


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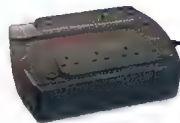


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ASUS Crosshair II Formula

Josh Collins scopes up to suss out the latest from ASUS, AMD and NVIDIA.

SPECS

Price TBC
Supplier ASUS
Website www.asus.com
Specifications Socket AM2+; 780a SPP and MCP; ATX form factor; solid state capacitors; 3-Way SLI support for AMD; Hybrid SLI support; 3x PCIe 2.0 x16; 2x PCI; 1x PCIe 1x; 1x EIDE; 6x SATA; 5200MT/s HyperTransport 3.0 interface; DDR2-1066; integrated graphics with HDMI output; dual gigabit LAN; LCD POST display.

Coming 18 months after the last R.O.G. AMD platform, the Crosshair II Formula picks up where the original Crosshair left off. It's not surprising, though we think of the IT industry as fast moving, that so much time has passed between releases.

The reason for the time lapse between the two boards is due mainly to the 'Crosshair' moniker being attached to NVIDIA chipsets for AMD. The original Crosshair was based on the nForce 590 chipset; the next release from the nForce range for the AMD platform was a rather failed one – this was the prosaic 680a chipset. This chipset only saw the light of day via the ASUS L1N64-SLI WS and could only utilise the Socket L1-based FX-70, FX-72 and FX-74 processors. Unfortunately these processors offered underwhelming performance and a faux quad-core solution by way of a dual-core DP setup more akin to

an Opteron-based DP server than a desktop system.

With little product support from any direction, the 680a was a flop. This time around, it's back to a single socket, AM2+ based solution, based around the nForce 780a SPP and MCP. With support for Phenom X4 quad-core processors, no special sockets, no special processors and no one-of-a-kind expensive motherboards, the new chipset may just be up to the task of making some sort of penetration into the desktop market.

The 780a chipset found at the heart of the Crosshair II Formula feels like a mix-and-match from the features of the 680i for Intel based systems and the functionality found in the recently released AMD 780G chipset. It supports the NVIDIA 3-Way SLI standard, albeit only with three 8x electrical PCI-Express slots rather than the full 16x found on the 780i and 790i for Intel systems. On the 780G-esque side of things, the 780a sports an integrated GPU solution. It includes a D-SUB and HDMI output; the HDMI output can be converted into a DVI connection with the bundled dongle. This setup supports a resolution up to 1920 x 1200 before requiring a dedicated graphics card to go further.

What's funky about this integrated GPU is that it actually isn't half bad. Using up to 512MB of memory of the system memory, the little trooper managed 1234 marks in 3DMark06 and in Crysis, with all settings set to low and a resolution of 1280 x 1024, it managed an average, minimum and maximum of 15.34, 9.41 and 21.86 respectively. While this isn't exactly playable, it does indicate that this type of

solution could be a real winner for the lowest of the low-end budget gamer just looking for that quick, cheap and nasty fix of Counter Strike in between watching high definition movies.

So, the new platform from the AMD, NVIDIA and ASUS collective isn't looking too shabby; right up until you start tweaking the system. On our first time through the BIOS, the system allowed a number of memory dividers, the two highest of which were set for DDR2-800 and DDR2-1066. But, unfortunately, the DDR2-1066 divider could not be implemented into matter what we tried. No amount of voltage coercion could get it to stick, so we were forced to settle for DDR2-800, which meant a 1:2 divider.

We weren't stoked, but we figured we could make do and use a CAS3-based timing set, or at least a CAS4, seeing as we run DDR2-1000 4-4-4-10 as standard on our Intel DDR2 systems. But the life of a tweaker and their system is often not an easy one. What we first got was a restriction to a CAS Latency (tCL) of four, but then the lowest values for tRCD and tRP were only 5 – 'WTF?' we thought. As such, we tested with memory at DDR2-800 5-5-5-15 1T.

As always, we looked for the max bus frequency and in this case we maxed out at a HTT (FSB for the Intel peeps) of 263MHz – a sweet 63MHz gain.

Oddly, after having found the max HTT, and having a play at 250MHz HTT, the memory timings magically unlocked and a full set of CAS3- and CAS4-based timings were available. The catch, we soon found, was that none of them would actually work properly. Instead, what would happen is the settings would corrupt the hell out of the OS and ultimately render the system in need of a reformat – not ideal!

We like this board. We really do. To be honest, we'd like to love it – it's such a unique little performer. But until those glaring memory issues are solved it can only be good, not brilliant.

CRYSIS Comparison

200x12.5; DDR2-800 5-5-5-12-24 1T; Onboard GPU vs 9800GTX

	Onboard; low; 1280x1024	9800GTX; very high; 1280x1024
Average	15.34	21.76
Minimum	9.41	8.34
Maximum	21.86	25.50

Phenom X4 9850	200x12.5; DDR2-800 5-5-5-12-24 1T; onboard GPU	200x12.5; DDR2-800 5-5-5-12-24 1T; 9800GTX	200x15; DDR2-800 5-5-5-12-24 1T; 9800GTX	200x16; DDR2-800 5-5-5-12-24 1T; 9800GTX
Super Pi 4M	2m 43.301s	2m 41.008s	2m 18.419s	2m 13.567s
wPrime 32M	22.589s	22.84s	19.174s	16.310s
Hexus Pi Fast	45.79s	45.49s	39.17s	37.19s
3DMark06	1234	11952	13349	11567
CineBench R10 64-bit – single thread	2627	2638	3227	3392
CineBench R10 64-bit – multi-thread	7188	6993	11656	11899
Everest Read	6758MB/s	6948MB/s	7079MB/s	7119MB/s
Everest Write	4981MB/s	5027MB/s	5123MB/s	5176MB/s
Everest Latency	62.4ns	61.1ns	60.2ns	59.0ns

SCORE **7.5** OUT OF 10



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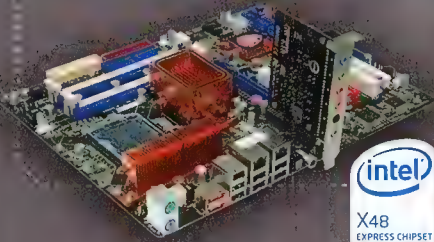
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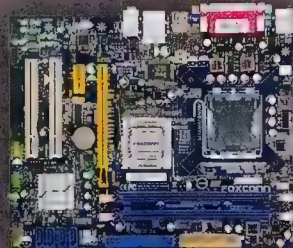
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Phenom X4 9850

Josh Collins wonders whether Phenom's finally come of age.

SPECS

Price **\$316**
 Supplier **AMD**
 Website **www.amd.com**
 Specifications **2.5GHz quad core;**
65nm manufacturing process;
'Agena' core; 4x512KB L2 cache;
2MB L3 cache; 12.5x multiplier;
4000MHz System Bus; 200MHz
HTT; B3 stepping; 125W TDP.

The last time we took a look at a quad-core from AMD it was the Phenom X4 9900. Coincidentally, that chip never actually made it to the retail public circulation, and neither did the X4 9700. So, with the X4 9600 sitting at the top of AMD's pile for some time, trotting along at a rather disappointing 2.3GHz and being eaten alive by the majority of Intel's offerings, there wasn't much to make it attractive. Being based on the B2 stepping with the Translation Lookaside Buffer (TLB) erratum – commonly referred to as erratum 298 – there wasn't a whole lot to feel thrilled about in the Phenom corner. Hell, the whole AMD camp was looking lackluster.

This month sees something of an AMD rebirth, or at least a string of new releases hitting with a bit more oomph than we've seen in the past 12 months, with the refreshed B3 Phenom X4 quad-core processors, newly released Phenom X3 triple-core processors, nForce 780a based motherboards, AMD 780G based motherboards and the new Athlon X2 4850e. It's an all round AMD lovefest.

So what's new? That is, other than the new products themselves.

Well, first up, the B3 stepping refresh fixes erratum 298 for the Phenom X4 range. This is denoted in the model number scheme by a five in the tens column; i.e. 9850. As was predicted back

in our X4 9900 review in issue 85, this refresh has hit on time in Q1 of 2008.

Next is a speed increase. Although we saw the X4 9900 part running at a stock 2.6GHz, the new X4 9850 that has been publically released operates at a stock 2.5GHz frequency. This may be 100MHz less than the X4 9900 but it also has a stock TDP of 125W – that's 15W lower than the 140W TDP of the unreleased X4 9900.

As the new top dog, and like the unreleased X4 9900, the X4 9850 sports a system bus frequency of 4000MHz, compared to the 3600MHz frequency of the second in line X4 9750 and old top chip the X4 9600.

What's also new is the overclocking capability of the B3 chips. It appears both from our own testing, as well as perusing the overclocking results on HWBot, that these chips are allowing

up to an extra 100MHz to 300MHz headroom over the maximum overclock compared to B2 chips. While the direct difference in final overclocks between our X4 9900 and X4 9850 sample was only 100MHz (3.15GHz compared to 3.25GHz), the effort taken to achieve the overclock has been vastly improved. In the past it was like pulling teeth – thank God it's better now.

We started by simply raising the multiplier, as in our last round with the X4 9900 proved this to be the best overclocking method rather than raising the HTT frequency. Doing so, we got a stable 3.2GHz (200x16) before hitting a brick wall. The 16.5x and 17x multipliers resulted in either a BSOD or an endless BSOW (Black Screen of Wait for those uninitiated to Vista). Still, the system felt like there was more left; all we had to do was find it.

So we gave HTT overclocking a go. Interestingly, we ended up with a maximum HTT frequency of 263MHz – a marked improvement on the 235MHz max of the X4 9900. Settling on 260MHz HTT with a 12.5x multiplier for the max outright frequency, we still found the previous max of 3.2GHz (200x16), using purely the multiplier, to be more stable.

At the end of the day, it feels like there could be a reason to by an AMD Phenom X4-based system now. Ultimately though, the Core 2 Quad range from Intel still smashes the Phenom X4 range into submission. At least, now, you can be a fanboi with a little bit of pride.



Phenom X4 9850	200x12.5; DDR2-800 5-5-5-12-24 1T; onboard GPU	200x12.5; DDR2-800 5-5-5-12-24 1T; 9800GTX	200x15; DDR2-800 5-5-5-12-24 1T; 9800GTX	200x16; DDR2-800 5-5-5-12-24 1T; 9800GTX
Super Pi 4M	2m 43.301s	2m 41.008s	2m 18.419s	2m 13.567s
wPrime 32M	22.589s	22.84s	19.174s	16.310s
Hexus Pi Fast	45.79s	45.49s	39.17s	37.19s
3DMark06	1234	11952	13349	11567
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CineBench R10 64-bit – multi-thread	7188	6993	11656	11899
Everest Read	6758MB/s	6948MB/s	7079MB/s	7119MB/s
Everest Write	4981MB/s	5027MB/s	5123MB/s	5176MB/s
Everest Latency	62.4ns	61.1ns	60.2ns	59.0ns

SCORE **7.0** OUT OF 10

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ASUS 9800GX2

And David Hollingworth cries, 'For the love of graphics, make it good!'



SPECS

Price \$748
Supplier ASUS
Website www.asus.com.au
Specifications 600MHz core;
 1000MHz memory (2000MHz effective); 1500MHz shader; based on 65nm G92 core; 256 (128x2) stream processors; 1024MB (2x512MB) GDDR3; dual slot PCB with active cooling solution; 6-pin + 8-pin PCIe power connector.

We've not been all that impressed with the highest end of the new 9-series, especially the dual GPU 9800GX2s. Given that the it'll take an enthusiast a lot of work to bootstrap themselves up to SLI heaven – buying a new board, and possibly more new hardware in a follow on effect – dual GPU cards seem a Godsend. In particular, ATI's

HD3870X2 is a gamer's dream come true – good performance and fair price.

With the clear performance advantage, not to mention the mindshare that NVIDIA enjoys, the GX2s should be wiping the floor, ruling the roost, and enjoying any other cliché you care to mention, but the fact is that it's simply not a card we can get behind.

Running at stock reference clocks, about the only thing that the ASUS 9800GX2 brings to the table that other models lack is a game in the bundle – Company of Heroes – aside from the usual cabling accessories. It's not an inspiring choice, and frankly if you've bought an ASUS card in the last six months or more it's a game you've already got, and you'll pay more for the privilege of that second copy.

There are only a limited amount of scenarios

where the 9800GX2 can be seen as a good choice – if you've skipped any 8-series purchases entirely, then this could be a good next card, though you will find cheaper models without the cache of the ASUS brand.

There's no doubting it's a performer, but when you think how popular the 8800 cards are, especially the GTS version, you're better off probably making that awkward leap up to SLI. Hell, if you've got an empty second PCIe slot, you certainly are! Given that two 8800GTXs in SLI outperform the ASUS model, and cost less, we'd be telling you a porky if we said anything other than "Wait for the next great leap forward." (P)

45nm Core 2 Quad @ 400x10; DDR3-1800 7-7-7-20 1T

	Crysis			3DMark06	3DMark03
	Avg	Min	Max		
1x ASUS 9800GX2 1GB	38.67	26.33	43.80	19709	65137
1x 8800GTS 512MB	20.32	15.51	23.35	14176	41583
2x 8800GTS 512MB	31.74	21.58	40.68	20009	68217

SCORE 6.5 OUT OF 10

ASUS 9800GTX 512MB

Mmm... donuts. Wait... graphics cards!
 Josh Collins can't quite decide.

SPECS

Price \$405
Supplier ASUS
Website www.asus.com.au
Specifications 675MHz core;
 1100MHz memory (MHz effective); 1688MHz shader; based on 65nm G92 core; 128 stream processors; 512MB GDDR3; single slot PCB with active dual slot cooling solution; two 6-pin PCIe power connector

The 9800GTX can be looked upon as a kind of cherry-picked super-clocked 8800GTS 512MB. In regards to technical specs they're much the same. Each features 512MB of GDDR3 memory, is based on the G92 core with 128 stream processors, has a 256-bit memory interface and also sources its power from two 6-pin PCIe power connectors.

As striking as it may look in the black, full length, shrouded cover, the 9800GTX isn't all that different from the 8800GTS 512MB; this is our biggest gripe. It's for this reason that each vendor needs to focus twice as much when trying to create some sort of differentiation between it and its market competitors.

While this and the uncanny likeness between the technical specs of the 9800GTX 512MB and 8800GTS 512MB has lead to some impressive price drops from some of the lower tier vendors, ASUS, along with other top tier players, has maintained price-point stubbornness.

While other lower tier partners push the prices down further and closer to the popular and good-value 8800GTS 512MB, the likes of this ASUS sample gets pushed further out of phase.

45nm Core 2 Quad @ 400x10; DDR3-1800 7-7-7-20 1T

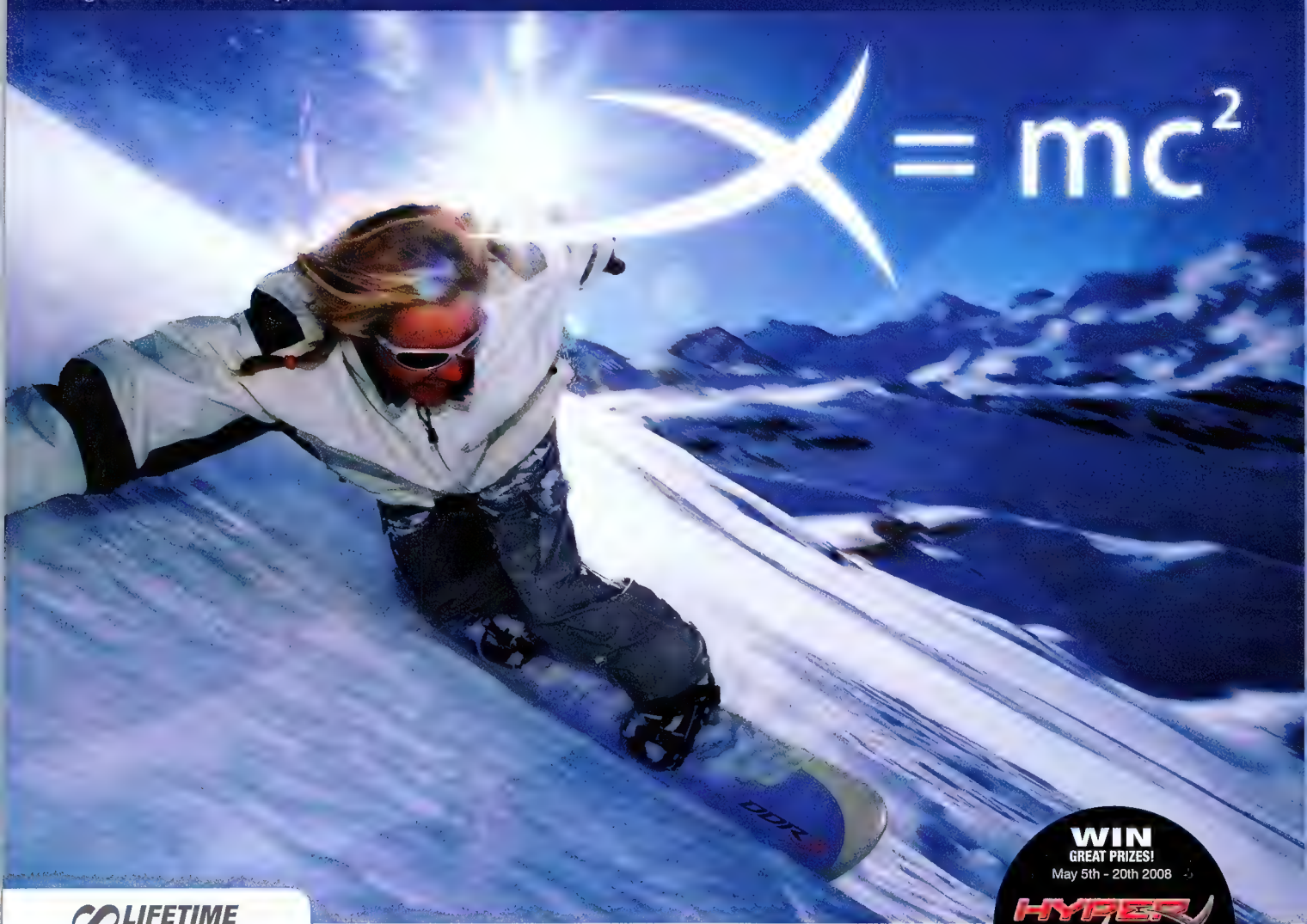
	Crysis			3DMark06	3DMark03
	Avg	Min	Max		
1x 9800GTX 512MB	22.95	17.89	26.09	14973	43278
1x 9800GX2 1024MB	38.77	25.87	44.28	19788	64499
1x 8800GTS 512MB	20.32	15.51	23.35	14176	41583
1x 8800GTX 768MB	20.71	13.98	23.54	13953	43238



The performance is strong, as should be expected. But it's not truly 'next-gen' and nor is it good value for the dollars spent when compared to other options in the marketplace, both within and outside the 9800GTX range. Effectively, this choice is like picking the fat kid to be in your team for the marathon. While they may know the track inside out and have plans to win, when compared to the competition just isn't enough there for the win to ever actually happen.

Fair effort ASUS, but you're best-off finishing that donut. (P)

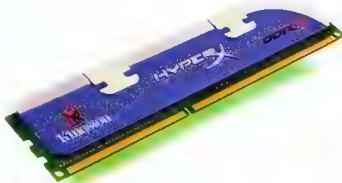
SCORE 8.5 OUT OF 10



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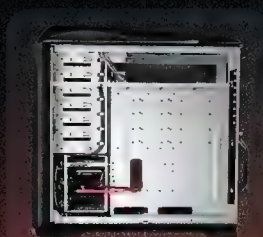


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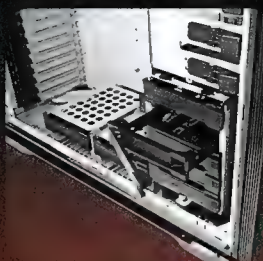
VH6000 Series



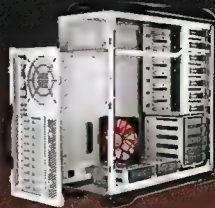
Armor+ dominates the gaming PC chassis sector with a new wave of extreme features. Unique sliding hood with top mounted tool box for storing tools and extra tid bits. Sliding motherboard tray and tool free design allows effortless system installation. Ten PCI slots provide increased space for future system expansion. Independent thermal management for CPU, VGA and HDD provide enhanced thermal dissipation.



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GIGABYTE GV-NX96T512HP

Josh Collins gets his game on... quietly.

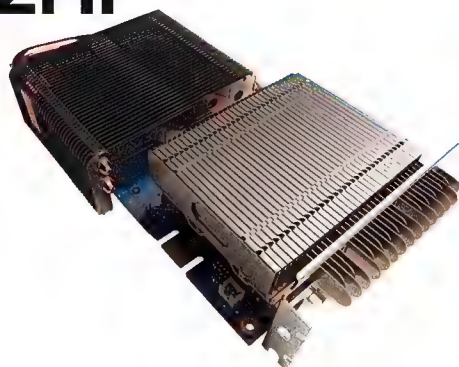
SPECS

Price TBC
Supplier GIGABYTE
Website www.gigabyte.com.tw
Specifications 720MHz core;
 1008MHz memory (2016MHz
 effective); 1800MHz shader;
 based on 65nm G94 core; 64
 stream processors; 512MB
 GDDR3; dual DVI; dual slot
 passive cooling solution; single
 6-pin PCIe power connector

a passively cooled card and it also featured some pretty impressive overclocked operating frequencies.

It's no surprise that it came to mind, not only because of the cooling method, but also the fact that the GIGABYTE model sports overclocked frequencies to boot. With the core rockin' on at an impressive 720MHz, memory at 1008MHz (2016MHz effective) and shader cruising at 1800MHz, this card is set to not only run quietly but do so with some gusto.

Thankfully, these are the only similarities that the passive GIGABYTE 9600GT has with the passive ECS 8800GT. If you think back to the ECS review, you'll remember that we encountered some heat-related issues during our testing. It puts a smile on our dial that the folks at GIGABYTE HQ have provided the market with a high performance card while also managing to keep the thermals in check. There's no denying the card gets warm to the touch



— it would be odd if it didn't — but the fact that it doesn't get ZOMGhot is impressive and allows you to enjoy the card's silent aural pleasure... assuming you're not disturbed by other components such as noisy CPU coolers or ratty HDDs.

At the time of print there was no price available to comment on, so on the sheer performance and functionality, we reckon GIGABYTE has produced a strong product for the marketplace.

The GV-NX96T512HP, or as we like to call it, the passively cooled 9600GT by GIGABYTE, is an interesting addition to the range of 9600GT-based graphics cards in the market.

Not only does it belong in that popular family, but this card also joins the ranks of passively cooled graphics cards. One that came to mind as we reviewed this card was the passively cooled 8800GT made by ECS that appeared in issue 85. It

45nm Core 2 Quad @ 400x10; DDR3-1800 7-7-20

	Crysis			3DMark06	3DMark03
	Avg	Min	Max		
GV-NX96T512HP	15.56	11.69	17.43	12615	38245

SCORE

8.0
OUT OF 10

GIGABYTE 9800GX2

Josh Collins does his darndest to find a diamond in the rough.

SPECS

Price \$727
Supplier GIGABYTE
Website www.gigabyte.com.tw
Specifications 600MHz core;
 1000MHz memory (2000MHz
 effective); 1500MHz shader; based
 on 65nm G92 core; 256 (128x2)
 stream processors; 1024MB
 (2x512MB) GDDR3; dual slot PCB
 with active cooling solution; 6-pin +
 8-pin PCIe power connector.

Last month we had a first squiz at the 9800GX2. The sample on show was from the folks at XFX but what we were checking out in detail was the technology behind the 9800GX2 and how it compares to other products in the NVIDIA family tree.

For those of you who read it, you'll know that we weren't too impressed by the 9800GX2 and frankly, we still aren't. Though prices have dropped, there isn't the necessary spark to light the fire of burning

desire that makes us yearn for one of these two-core graphics processing behemoths.

As much as the 9800GX2 has become cheaper since then, so too has the 8800GTS 512MB. What this means is that for an average of \$330 you can acquire one of these compellingly high-value bang-for-your-buck cards. And if you're truly wanting the pure pixel-pushing power of the 9800GX2, two can be fetched for \$660 — putting 60-70 odd dollars back in your hip pocket. This is, of course, dependent on the fact you'll require an SLI-capable motherboard to use the power of the two cards in tandem.

Now, we don't want to sound like we're bitching and moaning but unless you're looking to SLI two 9800GX2s to run your equally flamboyant dual 30in LCDs — Bah! Make that triple 30in displays — then you really aren't in the mood to care about value.

With value being such a sore point with these



cards, one way to win fans in the market is to create a top quality bundle — preferably a decent game of some sort. Unfortunately, it appears the GIGABYTE crew missed the memo and what you see in the corner up there is what you get. Oh, and some of the usual accessories like DVI to D-SUB converters.

Hit and miss? Well, given that our SLI GTS rig can actually outperform — and then some! See the figures — the GX2 on offer here, and for less, this one's a miss.

45nm Core 2 Quad @ 400x10; DDR3-1800 7-7-20 1T

	Crysis			3DMark06	3DMark03
	Avg	Min	Max		
1x GIGABYTE 9800GX2 1GB	38.74	22.66	43.64	19640	65188
1x 8800GTS 512MB	20.32	15.51	23.35	14176	41583
2x 8800GTS 512MB	31.74	21.58	40.68	20009	68217

SCORE

6.0
OUT OF 10

XFx 9600GT 512MB Alpha Dog Edition

Josh Collins discovers the difference between alpha and beta.



SPECS

Price \$265
Supplier XFX
Website www.xfxforce.com
Specifications 740MHz core; 1000MHz memory (2000MHz effective); 1850MHz shader; based on 65nm G94 core; 64 stream processors; 512MB GDDR3; dual DVI; single slot active cooling solution; single 6-pin PCIe power connector.

Last month Palit won the 9600GT 512MB crown with its, well, 9600GT 512MB. What made it a success though were not only the features but also the price point and performance on offer.

With a hard act to follow, XFX has brought in the big gun, the XFX 9600GT Alpha Dog Edition, with the core overclocked to a strong 740MHz from the reference clock of 650MHz found on last month's submission. The overclocking doesn't stop there. The memory has been cranked up to 1000MHz (2000MHz effective) and the shader pushed up to

1850MHz – that's 225MHz above the reference clock.

With the extra grunt at hand, the card, in *Crysis*, pulled an extra three FPS above the average and maximum FPS of the reference clocked card from last month and one FPS higher in minimum FPS. The gains were obvious as well in 3DMark06 and 3DMark03 with 1.4k and 4k point gains witnessed in both.

While these may seem like mediocre numbers in these high detail settings, when the details in *Crysis*, for example, are reduced from the 'very high' settings we test at down to the high and/or medium settings, this extra pixel processing power could be the difference between unplayable, playable and actually enjoyable.

The old stock of this card comes bundled with *Company of Heroes* – that's what our sample happened to have – but the refreshed game bundle now features *Assassin's Creed* which brings the

package up to a whole new level with a newer title attached.

So, XFX has the performance and the bundle sorted, but the overall value when bringing the price into consideration leaves room for debate. Weighing in at \$265, the card is \$50 more than a reference clocked version at time of print. This means when compared rather bluntly, you pay \$50 extra and get a pre-overclocked card and *Assassin's Creed*. For some this may be enough to warrant it but no doubt, others will still opt for the cheaper solution, ignore the game and overclock the card themselves.

45nm Core 2 Quad @ 400x10; DDR3-1800 7-7-7-20 1T

	Crysis			3DMark06	3DMark03
	Avg	Min	Max		
XFx 9600GT 512MB stock	13.98	10.40	15.26	11479	34968
XFx 9600GT 512MB Alpha Dog	16.15	11.82	18.58	12811	38993

SCORE **7.5** OUT OF 10

Corsair Dominator TWIN3X4096-1600C7DHXIN

Josh Collins drools over Corsair's latest DDR3 kit.

SPECS

Price \$900
Supplier Corsair
Website www.corsair.com
Specifications 2x 2GB kit; PC3-13000; DDR3-1600; 7-7-7-20; 1.9v; 240-pin DIMM; Non-ECC Unbuffered DDR3; Micron ICs; Lifetime warranty.

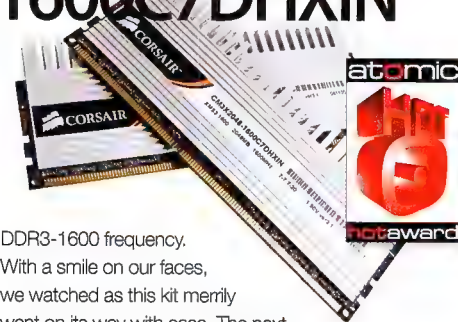
Not content with being a market leader in the 2x1GB DDR3 race, Corsair has pushed forward with a very aggressive 2x 2GB kit. Instead of going soft and releasing a high density 4GB kit with low frequency and high latency, Corsair's done the opposite.

Hitting the market in the proverbial gonads, Corsair has released a kit rated for DDR3-1600

at latencies of 7-7-7-20 featuring Intel's Extreme Memory profiles – we were quite impressed when we first heard the news.

The modules use 128MB ICs with 8 ICs attached to each side of the modules' PCB. With an operating voltage of 1.9v compared to the 2.0v commonly found on the Dominator series, the modules still cruise along at the comparatively high frequency of DDR3-1600. Now, we've seen the Dominator series do these speeds at the same volts and we've even seen higher frequencies at the same voltages. Therefore, we wanted to know what these modules could do if pushed.

The first test, naturally, was to see if we could tighten up the timings to a more preferable 6-6-6-18 and with a 1T command rate while retaining the



DDR3-1600 frequency. With a smile on our faces, we watched as this kit merrily went on its way with ease. The next test was to see if it could go up a step to DDR3-1800 while maintaining latencies of 7-7-7-20 1T. And guess what? The kit did so and again with similar grace. No BSODs here, just pure win.

As these modules utilise Micron D9 ICs, with a bit more tweaking and some voltage lovin' these modules have the potential to achieve some even more amazing performance heights. But for now, for the large majority of us, the concept of 4GB of DDR3 memory is still a dream we're left to drool over while cursing those fortunate to have the money to spend – \$900 is a lot to spend on RAM – on such performance.

	400x8; DDR3-1600 6-6-6-18 1T	400x8; DDR3-1600 7-7-7-18 1T	400x8; DDR3-1800 7-7-7-20 1T
Capacity	2x2GB	2x2GB	2x2GB
Super Pi 4M	1m 18.375s	1m 18.718s	1m 18.811s
wPrime 32M	12.059s	11.871s	11.999s
Hexus Pi Fast	28.70s	28.94s	28.88s
Everest Read	12051MB/s	11716MB/s	11676MB/s
Everest Write	8526MB/s	8527MB/s	8525MB/s
Everest Latency	49.9ns	52.6ns	51.8ns

SCORE **9.0** OUT OF 10

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- Shader Clock: 1750MHz
- Memory Interface: 256bit
- 512MB DDR3 Frame Buffer Size



8800 GT AMP! Edition

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- Memory Clock: 2000MHz
- Shader Clock: 1700MHz
- Memory Interface: 256bit
- 512MB DDR3 Frame Buffer Size

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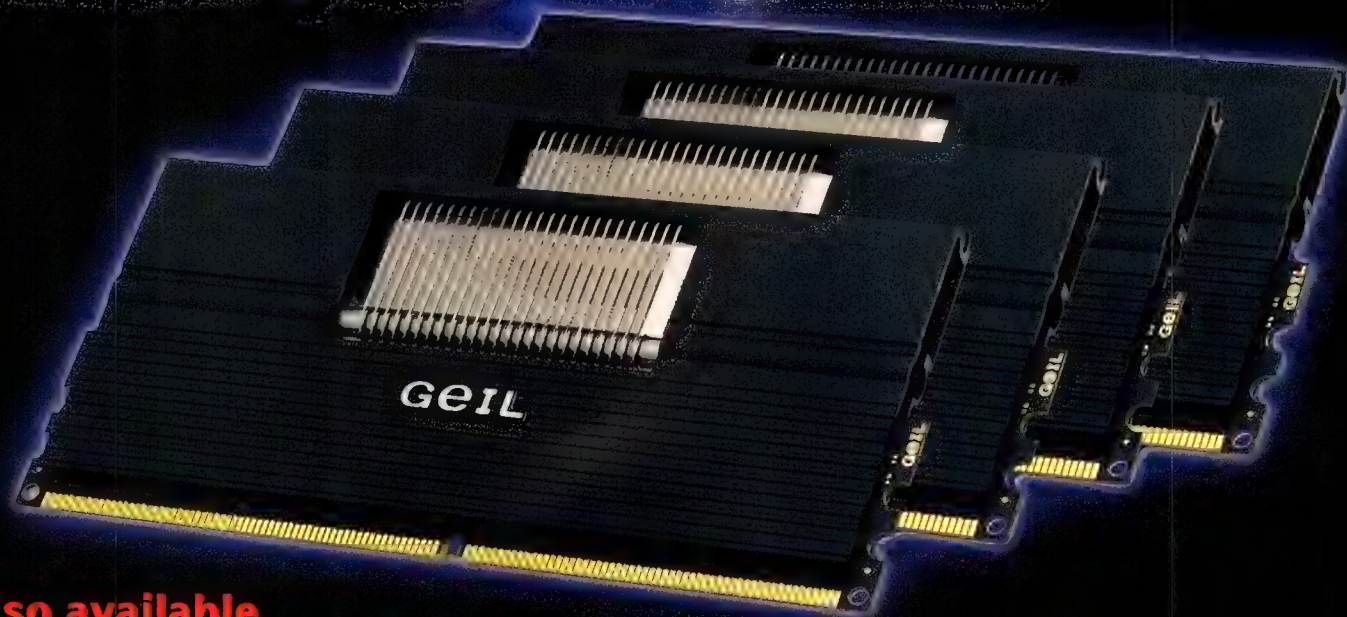
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ASUS Xonar DX PCI-E

There's nothing Creative about this new card from Asus, and Jake Carroll likes it that way.

SPECS

Price \$TBC
Supplier Asus
Website www.asus.com.au
Specifications PCI Express Rev.1.0a compatible; Max. full 2.5Gbps bandwidth per direction and optimized latency for high-definition audio processing; Compatible with X1, X4, X8, X16 PCI Express slots

'disruptive' product in the face of the Creative X-Fi behemoth.

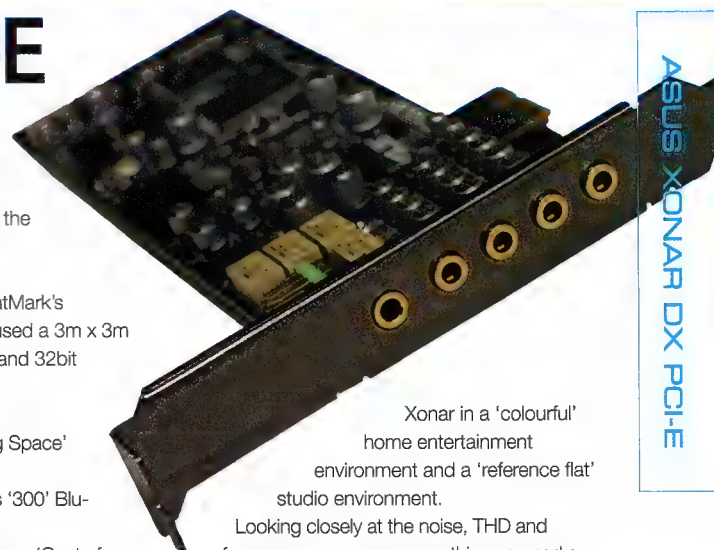
As always, we employed RightMark's Audio Analyzer for metrics. We used a 3m x 3m carpeted room and 16bit, 24bit and 32bit audio content:

- 16bit, 44.1kHz: Cog's 'Sharing Space' [CD Audio]
- 24bit, 96kHz: Warner Brothers '300' Blu-Ray DVD [BD PCM Audio]
- 32bit, 192kHz: Biped Productions 'Gust of Gravity, In Superposition' [ProTools Audio]

We used two sets of enclosures:

- Altec Lansing 621's
- Tanoy Reveal 6D monitors

Two sets of enclosures have been used here in order to highlight any obvious performance differences in a contrasting set of environments. This way, we can gain an appreciation for the



ASUS XONAR DX PCI-E

Xonar in a 'colourful' home entertainment environment and a 'reference flat' studio environment.

Looking closely at the noise, THD and frequency responses, something seemed a little upsetting to us. This card is outperforming the reference X-Fi chipset in certain cases. Even the mighty Auzentech X-Fi prelude was not capable of a 105.4dB (A) dynamic range in 32bit, 192kHz mode.

Note the use of INT based 32bit resolution for testing here. One problematic point we've found with the Xonar is that it wouldn't allow us to test 32bit IEEE. We couldn't isolate whether this was driver related or hardware related.

EAX 5.0 – WTF?

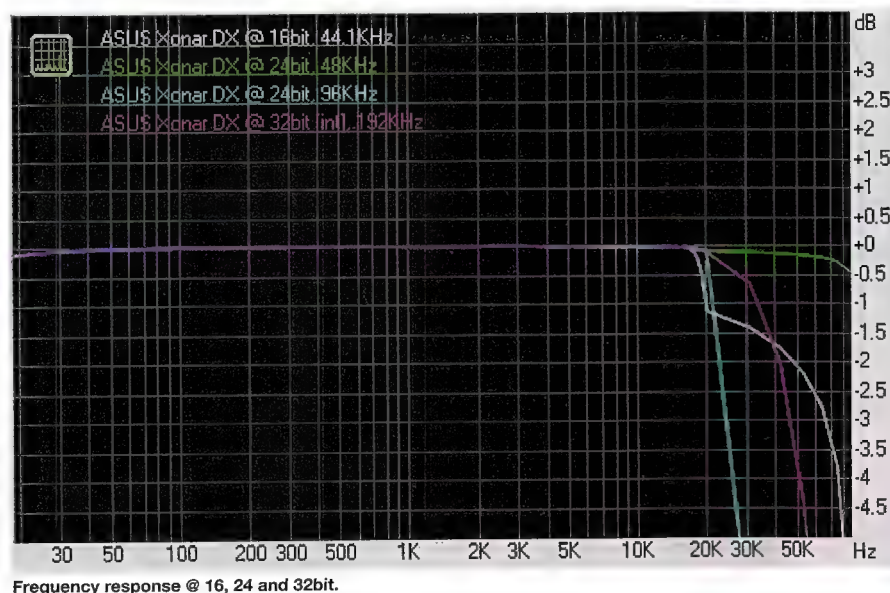
Something isn't making sense. How can the ASUS product use Creative's proprietary environmental acoustic modelling? The truth is, it doesn't. Creative's using some sweet driver trickery in the form of DS3D GX2. Call it environmental modelling 'cheating' if you want. Either way, it has proven convincing. We found EAX 5+ working correctly in *STALKER*, *Battlefield 2*, *HL2: Episode 2*, *TF2*, *Prey* et al.

Finally, it was time to sit on the big couch and have a listen to the Xonar with our eyes closed. It was evident that the card had 'everything' that an X-Fi chip had. All the particular nuances we've come to expect from an enthusiast's card such as the crisp bass responses, detailed instrument inflections and obscured slightly positional discrete sounds in studio recordings came up with vibrancy. Shamefully, we had no DTS output however. The card simply doesn't support it.

An interesting mix of things, the Xonar DX is (sound like Yoda, you do –ed). Where Creative's X-Fi experiences driver problems and 'PCI-pop's', the Xonar sits stable in the PCI-E slot. Sure, it might not have the stunning audiophile-esque ratings that an Auzentech OPAMP boasts, nor does it exhibit the loom of outputs/supported DTS decoders, but it surely hits the mark for a mid-market card. Do yourself a favour. Stop breathing the Creative air. Get on the PCI-E bus. (C)

Test	ASUS Xonar DX @ 16bit 44.1KHz	ASUS Xonar DX @ 24bit 48KHz	ASUS Xonar DX @ 24bit 96KHz	ASUS Xonar DX @ 32bit 192KHz
Frequency response (from 40 Hz to 15 kHz), dB	+0.01, -0.04	+0.01, -0.04	+0.01, -0.03	+0.00, -0.04
Noise level, dB (A)	-96.6	-97.1	-97.3	-105.7
Dynamic range, dB (A)	92.6	97.1	97.1	105.4
THD, %	0.002	0.0013	0.0013	0.0009
IMD + Noise, %	0.0085	0.0072	0.0074	0.0017
Stereo crosstalk, dB:	-92.6	-93.8	-91.6	-92

ASUS Xonar DX loopback results.



SCORE **8.0** OUT OF 10

Dell XPS 630

Dell can make some very pretty PC packages, but David Hollingworth thinks this latest isn't quite up to scratch.

SPECS

Price \$2,597

Supplier Dell

Website www.dell.com.au

Specifications Intel Core 2 Quad Processor 2.4GHz Q6600; Dell 24in E248WFP Wide Screen Flat Panel LCD Monitor; 3GB (2x1GB, 2x512MB) NECC Dual Channel DDR2 800MHz SDRAM; 500GB SATA; 16x DVD +/- RW; 512MB PCIe x16 NVIDIA GeForce 8800 GT; Integrated 7.1 Audio; Dell A525 Stereo Speakers with Subwoofer; Dell USB enhanced keyboard; Dell Premium Optical Mouse; Microsoft Works 9.0; McAfee Security Centre 15 months OEM; Windows Vista Home Premium 32bit; Free recycling of any brand of computer and/or monitor upon delivery

Since the early days of Dell's breakout from the beige box jungle, the company has endeavoured to produce cases a cut above the average, both in raw case functionality and the manner in which the componentry has been assembled within. The XPS 630 continues that trend.

This is one tidy little PC, and you could do a lot worse than opening this puppy and learning a few lessons about airflow and cable management. One thing you do notice right away is that the motherboard is upside down, which might seem odd, but it actually makes access to memory and graphics slot super easy, and create a lovely open area and places all the major hot spots in the main airflow corridor, leading from a 200mm fan set behind the case's front fascia, through the CPU's fan/heatsink combo, and out of the open mesh at the case's back plate.

The case itself, however, does raise a few curious eyebrows – at least it certainly did while it had pride of place on our testing bench. It's hard to put your finger on exactly why the case design doesn't seem to fit right; perhaps it's the odd, two-tone brushed matte silver and gloss cherry-red

the side plates themselves are super solid. Not so solid are the plastic additions, some of which were even warped slightly off true in our review model.

There are no complaints, however, about the 24in Dell monitor that comes with the bundle, which is of the usual high quality and looks as good as the picture it displays. The XPS 630 does come with bundled speakers, too, but given that the 630 features integrated 7.1 sound output, the 2.1 set you get in this bundle might not be the best choice. That said, it does the job with no complaints, as do the keyboard and mouse. All solid, if a little uninspired.

So far it might seem a common litany – the 630 is almost great, but for a few odd decisions. Sadly, that same story gets told when it comes to the single most important aspect of any PC: its performance.

“...the machine we had in our office fell just shy of our expectations...”

colour scheme? Maybe it's the BMW-style dual air intakes that adorn the front fascia, or perhaps the canted overall design. Regardless, it's not something that sat well with the picky aesthetes of Atomic HQ.

Then again, we may just be hard to please and the 630's case might rock your socks off. At the very least the case does offer a very easy to use sliding lock to open up the side of the unit, and

Don't get us wrong – for the price, this is a damn good package, but our benchmarks simply don't return the kinds of scores we were hoping for. Running at our standard 1280 x 1024, with medium settings, 3DMark06 did its pretty thing and awarded the 630 with 10,543 3DMarks. That's solid, sure, and if you've been following the recent spate of gaming laptops we've been reviewing it's a stark reminder of just



how much more performance you'll get out of the average desktop PC. That said, we'd been hoping for something a bit higher – maybe in the area of 11,000. Similarly, you've got to respect any machine that can manage *Crysis*, with all the pretty bits turned on, at 1280 x 1024, while maintaining a 17fps average and a peak fps of 20. But, again... not ideal.

The main culprit is certainly not the 8800 GT, nor the perfectly adequate CPU. No, in our minds, the four sticks of non-Micron D9 memory – and only 3GB of it at that – is the bottleneck. Choice of memory was the downfall of the 720 (reviewed issue 79), and it seems that it's a lesson that Dell's yet to learn.

Of course, you can easily tweak the build to advantage on Dell's website, but the system we had in our office fell just shy of our expectations of performance for its price. It makes an excellent base for a system you can expand into, however, but it doesn't quite seem to earn the XPS moniker.





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THECHIPPERY

Silicon wars and
opinion from the
electron trenches.



Mean and green

Believe it or not, but Josh Collins cares as much about global warming as the next man.

Greenies. God bless their little hemp socks, but for the love of that same big man, will you please bugger off and leave me the hell alone!

Now, it's not all that often I'll publicly lash out at one thing or another, but it really has gotten to a point where I just must have a rant about the way the average greenie will harass, irritate, pester and generally annoy a computer enthusiast. You see, in their eyes, we're like the spawn of Satan, well, at least second to the oil companies and other big industries. It is automatically assumed that the computer enthusiast is an earth hating, energy hungry, ignorant arse-hole.

But let's take a trip back to what's caused this rage.

The other day I realised that in roughly four days I was 'asked' (read: accused and harassed) several times whether I cared about the carbon footprint I was leaving with my computer enthusiast habits and the energy I was wasting. This was based on their 'informed' assumption that my four computers, Playstation 3, Xbox 360 and 40in Bravia LCD TV were left on 24/7.

You see, while we're not enemy #1 of the large environmental organisations – that's reserved for the energy burning oil and car industries – we appear to be public enemy #1 for the average-Joe greenie. While they can't for the life of them take on the big industries, they can do their part by annoyingly chirping their qualms into the ear of the closest computer enthusiast.

My general reaction to these individuals is rather dismissive. I have neither the time nor patience to deal with the regurgitated speech they memorised from Al Gore. In their eyes, this is due to me being an ignorant energy waster. But the truth is that I am actually a conscientious user of all of my electrical equipment.

All of my computers are only turned on when I need to use them – this includes my file server. Now, being a conscientious user – due to my knowledge of the tech I use – I go as far as to completely unplug every system from the wall socket to assure that no energy is wasted by sitting in standby mode.

**“We still
require these
systems for work,
rest or play, but that
doesn't excuse
ignorance...”**

The main reason for this was when I found out that my Shuttle had the capacity to use up to 75W/day while turned off and in standby mode – above the average of 25-30W that we've measured in the labs. Then, to further enforce the issue, it's a well known fact that LCD and Plasma TVs can use anything from 100W to 1500W depending on the size while turned on and up to 9+W/day in standby mode.

Now excuse me for a moment as I will inevitably sound like an annoying greenie, but bugger me that's a huge amount of energy wasted every hour, every day, every week and every year. Call me selfish, but I'd be unplugging just to save some money in the long run, much less the positive effect doing so would have on the environment.

While LCD technology is more efficient than plasmas when it comes to energy consumption and use, we can still do our bit to assure that we're mindful of our usage patterns. We still require these systems for work, rest or play, but it doesn't give us a ticket to ignorance.

Energy Australia provides a useful PDF document on energy usage (available at <http://tiny.cc/CCc1h>) and through this we can make our own informed decision and choice as to how we wish to impact upon our energy usage patterns.

There are many reasons to get behind the energy conservation bandwagon, be it because you're awfully concerned for your great, great grandchild's future or just want to watch your budget's bottom line; there will always be responsible and irresponsible users and it is up to you which side of the line you fall on. For me, I like to be responsible so I can then righteously crack it at the uninformed greenie next time they bug me.

Ignorance is bliss but knowledge is power. Now stop bugging me!

No polar bears were drowned in the writing of this piece.
jcollins@atomicmpc.com.au





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Inno3D GeForce 9600GT

Specifications

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Lemon-fresh power supplies

Daniel Rutter has a fresh scent and some words of advice.

The *Market For Lemons* is the title of a rather famous paper by the economist George Akerlof. It describes a phenomenon you should learn about, especially if you assemble your own PCs or buy computer stuff on eBay.

Akerlof's paper's name comes from the used car market. The idea is that most buyers can't tell a great used car from an average one or a lemon. So they won't want to pay more than the price of an average car for *any* car, because otherwise they're likely to be making a losing bet.

Now the average quality of cars on the market will have fallen, and even people selling what used to be an average car won't be able to get a fair price. So they too will drop out of the market. Eventually, there'll be nothing but lemons.

The lemon-market phenomenon never, fortunately, *entirely* controls a real market, because few buyers are *entirely* ignorant about product quality, and there are always some buyers prepared to pay more than is strictly rational, and some sellers against all reason will continue to try to sell a superior product.

But an awful lot of markets these days have a very strong lemon scent. There's almost always someone willing to sell garbage, and there's often also the critical 'quality uncertainty' among buyers. When sellers know how good their product is but buyers can't tell, you have the 'asymmetric information' that makes a lemon market possible.

Lemon-market rules apply, to some extent, to all sorts of things. Stock-market crashes, the Enron debacle, the current US subprime mortgage fiasco. Oh, and those cheap 'Gillette' and 'Schick' razor cartridges all over eBay? Almost all fakes, which have driven sellers of genuine cartridges out of business.

And in the computer world, the same rules apply to flash memory cards and power supplies.

If you're lucky, the cheap 'Sandisk' or 'Lexar' memory card you just bought on eBay will turn out to be a slow card with a forged sticker stuck on it. If you're less lucky, you'll get a card that only actually has half or less of the storage capacity that it says on the label.

And power supplies can be just as bad. Most '500 watt' PC PSUs can't actually deliver 500 watts constantly for any length of time.

That's often okay, because it's hard to create a computer that loads up the different rails of a power supply in the right proportions to add up to the total power rating. If the degree of spec inflation is not high, then it won't actually matter any more than the fact that the deceptively high maximum value on your car's speedometer.

But suppose you're an eBay bargain hunter armed with the knowledge that your new gaming box will have an actual peak power draw of, say, 350W, well within the capacity of any decent '500W' unit. You may be dismayed to discover that the '500W' PSU you bought from a marvellously cheap eBay dealer will barely get your PC to a Windows desktop, much less let you run a 3D game.

Specification inflation in PC power supplies has now officially become bad enough that no-name generic 500W PSUs may barely even be able to deliver 250 watts (tinyurl.com/2QVAVA). A realistic constant rating for these units is more like 200 watts. So the capacity inflation factor's hit 2.5, and is still rising.

People who buy those \$50 '500W' PSUs may, later on, come back to buy a more honestly specified \$150 unit from someone else later. I wouldn't want to be the dealer who's waiting for that to happen, though.

The Market for Lemons explains how the

sellers of fakes can make things difficult even for people who've no interest in buying cheap 'n' dodgy merchandise. Fakeness plus information asymmetry can drive the products that people actually want to buy right out of the marketplace.

“If you're lucky, the cheap 'Sandisk' or 'Lexar' memory card you just bought will turn out to be slow...”

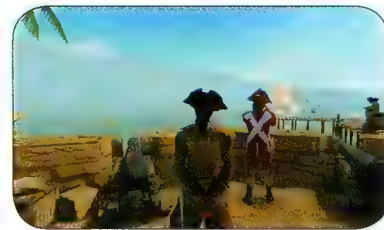
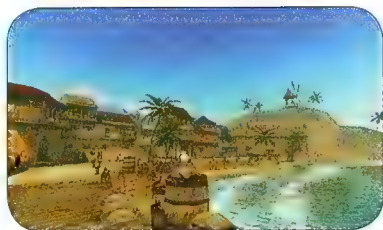
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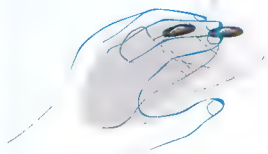
Our choice for
the best gear the
land has to offer

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and

a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay,

just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

		CPU's	Motherboards	Memory	Video cards
BUDGET <i>I can't afford to eat, gimme gear!</i>	intel	 Intel Core 2 Duo PRICE \$100-\$480 Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E4400 is the cheap ticket to speed, at \$165. Reviewed in Issue 81 – Page 52	 GIGABYTE GA-G33M-DS2R PRICE: \$132 Using the G33 northbridge and has overclocking performance like its full ATX brethren, this Micro-ATX offering is extraordinarily hard to pass up. Reviewed in Issue 81 – Page 52	 TEAM Xtrem Dark PC2-6400 C4 PRICE \$95 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 – Page 56	 GeForce 9600GT 512mb PRICE \$372 It's simple, it's black, and pumps out some pretty pleasing pixels for a very reasonable asking price. So far, easily the best of the 9-series. Reviewed in Issue 87 – Page 43
	AMD	 AMD Athlon 64 AM2 X2 PRICE \$135-\$335 Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about \$85. Reviewed in Issue 89 – Page 40	 GIGABYTE AM780GM PRICE \$100 NEW ENTRY This mobo had Josh drooling and dreaming of the ultimate budget media center – not a state he often finds himself in! Reviewed in Issue 89 – Page 40	 TEAM Xtrem Dark PC2-6400 C4 PRICE \$95 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 – Page 56	 GeForce 8800GTS 512MB PRICE \$413 The 8800GTS manages to outperform both the 8800GT and the ATI HD3870, which is no mean feat, and manages it at a fair price. Tasty. Reviewed in Issue 87 – Page 49
PERFORMANCE <i>Hardware that bangs the best for buck.</i>	intel	 Intel Core 2 Quad PRICE \$300-680 Core 2 Quad – a processing powerhouse, now affordable and overclockable like buggery. The Q6600 is the best buy, at about \$336. Reviewed in Issue 85 – Page 48	 Foxconn P35 Mars PRICE \$236 A great board for the enthusiast with a mess of great ideas and good overclocking potential. Reviewed in Issue 85 – Page 48	 TEAM Xtrem Dark PC2-6400 C4 PRICE \$95 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 – Page 56	 GeForce 8800GTS 512MB PRICE \$413 The 8800GTS manages to outperform both the 8800GT and the ATI HD3870, which is no mean feat, and manages it at a fair price. Tasty. Reviewed in Issue 87 – Page 49
	AMD	 AMD Athlon 64 AM2 X2 PRICE \$135-\$335 The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 6000+ is your current sweet spot at about \$235. Reviewed in Issue 85 – Page 51	 ASUS M3A32-MVP Deluxe PRICE \$242 NEW ENTRY True perfection in mobo form. Very well laid out and overclockable to boot. Reviewed in Issue 85 – Page 51	 TEAM Xtrem Dark PC2-6400 C4 PRICE \$95 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits. Reviewed in Issue 80 – Page 56	 GeForce 8800GTS 512MB PRICE \$413 The 8800GTS manages to outperform both the 8800GT and the ATI HD3870, which is no mean feat, and manages it at a fair price. Tasty. Reviewed in Issue 87 – Page 49
EXTREME <i>Dimme power. Money is no object.</i>	intel	 Intel Core 2 Extreme QX970 PRICE \$TBC The cream of the overclocking crop, based on the new Yorkfield architecture. Truly, Lord of the CPUs. Reviewed in Issue 86 – Page 48	 XFX 790i Ultra SLI PRICE \$555 It's an imposing board that offers a host of enthusiast options, performance tweaks. We like. Reviewed in Issue 88 – Page 40	 Corsair Dominator PRICE \$777 All up one of the most powerful and versatile kits we've seen. Reviewed in Issue 87 – Page 36	 XFX 9800GX2 PRICE \$872x2 Reviewed in Issue 88 – Page 50
	AMD	 AMD Athlon 64 FX-62 PRICE \$1072 Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile. Reviewed in Issue 66 – Page 39	 ASUS Crosshair 2 PRICE \$TBC NEW ENTRY Quite simply the new and leading kid on the block when it comes to AMD boards. Reviewed in Issue 89 – Page 42	 Corsair Dominator Twin2X 10,000 PRICE \$1016 Crazy speed sticks that will also happily do 1T/800MHz/3-3-3-3. Comes with a fan attachment to keep things cool! Reviewed in Issue 77 – Page 58	 Powercolor HD3870X2 PRICE \$572x2 Reviewed in Issue 87 – Page 44


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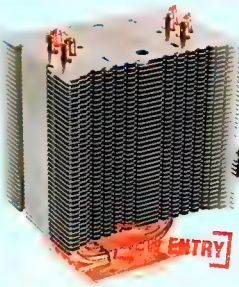
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Reviewed in Issue 89 - Page 36



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PRICE \$68

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Reviewed in Issue 69 - Page 40



Samsung 931C
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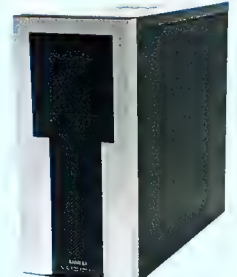
Reviewed in Issue 70 - Page 56



Steelcase 5Hv2
PRICE \$120

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Reviewed in Issue 73 - Page 43



Lian Li PC-7S
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Reviewed in Issue 79 - Page 46

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Seagate Barracuda 7200.10 320GB
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Seagate's fancy new technology makes this beast both fat and fast. Mmm, toasty.

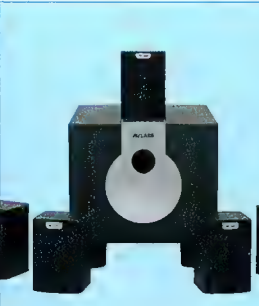
Reviewed in Issue 69 - Page 40



Samsung 244T
PRICE \$999

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

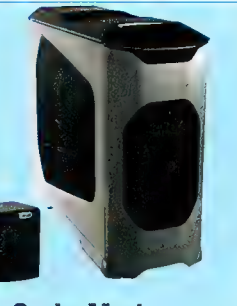
Reviewed in Issue 69 - Page 48



AVLabs AVL325
PRICE \$165

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in Issue 64 - Page 50



Cooler Master Stacker 830
PRICE \$285

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in Issue 61 - Page 36

Asetek Vapochill Lightspeed
PRICE \$1020

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in Issue 64 - Page 38



Western Digital Raptor WD1500ADFD
PRICE \$264x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

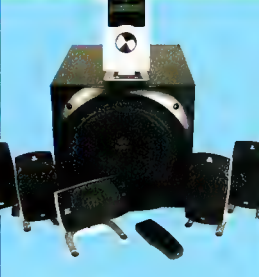
Reviewed in Issue 62 - Page 40



Dell 3008 WFP
PRICE \$2299

It's enough to make a grown man weep and beg. Or, at least, that's what we'd do for one of these simply gorgeous displays.

Reviewed in Issue 88 - Page 59



Logitech Z-5500D
PRICE \$363

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in Issue 48 - Page 56



Silverstone TJ07
PRICE \$348

The Silverstone Temjin TJ07 is a huge hulking beast that shows you mean business in the finest style. Impeccable finish and plenty of room means win.

Reviewed in Issue 65 - Page 49

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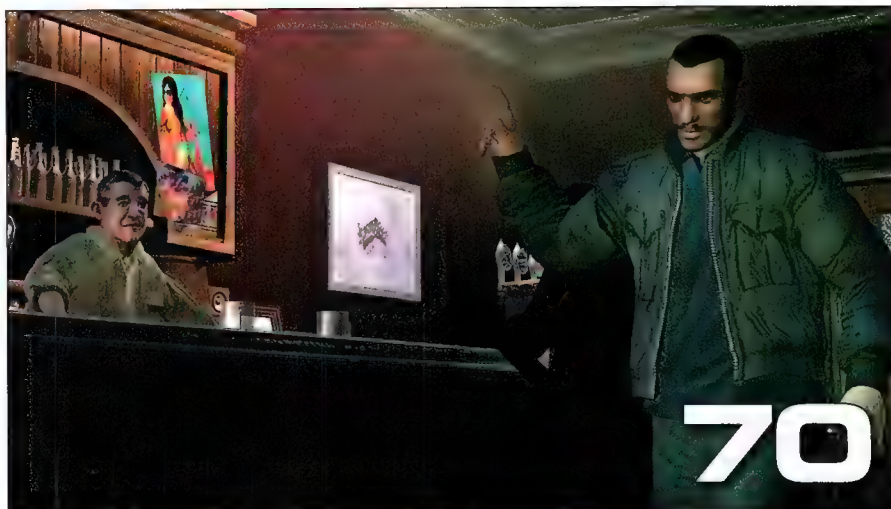
We're definitely getting into the swing of the gaming year now, when finding that special time to sit down with your special platform – PC, Xbox or PS3 – isn't the problem; it's choosing what damned game to play!

It's a small mercy that, this month, the game we've really been waiting for came out last. It meant we had time to fire up our force feedback steering wheels and take a spin with Gran Turismo 5 Prologue and Race Driver GRID. They're two different games, and Josh has given both of them a thorough thrashing. The sport doesn't end there, as we even have FIFA Street to keep

the soccer fans amongst you interested.

And, once we'd spent a bit of time with the odd sport-cum-shoot'em-up The Club, the real deal crossed our desk.

We can't quite describe the anticipation of holding in your hands a game like Grand Theft Auto IV; as time of press, it's already breaking records and making headlines – hell, there's even been a stabbing in a line-up outside one overseas games store! And it's in our hands... you'll find out what we think in a page or two, but, for now... Wow.



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Prototype 66
Logan Booker mutates into something faster and stronger to bring us the latest on this open-ended actioner.

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It's CPU wow time, with Zara Baxter.

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Daddy, where do supers come from?

Logan Booker splices genes with Radical Entertainment's Tim Bennisson, executive producer on *Prototype*.

Not everyone can be a superhero. Otherwise we'd all just be heroes. For saving lives, someone like Superman would not be rewarded the key to the city. Instead, his mates would call him a show-off behind his back. Before long, old Superman would find himself 'accidentally' forgotten in the work email for Friday night drinks at the pub. The comfort of a cold beer and friendly companionship would be replaced by an evening alone with a copy of *The Notebook* and a litre tub of double-fudge chocolate ice cream.

No, superheroes have to be made of sterner stuff than the rest of us, hopefully stern enough to resist bullet impacts, survive drops from ridiculous heights and metabolise double-fudge ice cream in mere seconds.

In recent times, we've had a chance to weld a few chunks of this magical superhero material to our bodies. 2007 had us leaping around a metropolis as a mega cop in *Crackdown*, while *Assassin's Creed* allowed players to perform unbelievable feats of athleticism as Altair. Now, Radical Entertainment is swinging its giant super arms around the open-world superhero genre with *Prototype*. Radical doesn't want to just punch a few street thugs 400 metres into the air or toss tanks around like tiddlywinks. No, with *Prototype*, Radical is aiming to deliver fun, depth and an interactive, yet crazy-creepy story the likes of which we've not yet seen.

What's a mutant to do?

Tim Bennisson is executive producer on *Prototype* and as such, has a firm grasp on what the game involves. He was kind enough to explain the crux of the story, including details on its protagonist. "*Prototype* is essentially an origin story revolving around a

shape shifter called Alex Mercer," says Bennisson. "It begins in 2008 and is set in New York City. As Alex, you will be gradually entangled in a three-way war that spirals out of control and spills onto the streets of New York."

Behind the scenes is a government conspiracy that will be revealed over time through *Prototype*'s multi-layered plot. Radical has named the delivery mechanic for the story the 'Web of Intrigue', and it believes fans of the TV show *Lost* and Tom Clancy novels will love the tangle of details as they add up to a thrilling whole.

Gene play

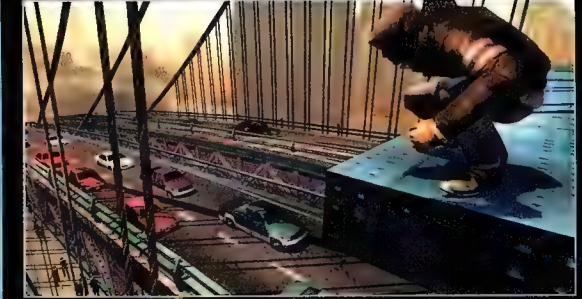
We know that Alex is more than he appears – literally. He has the ability to 'consume' the DNA of others and add it to his own, to increase his power or to shift his form to match that of the captured DNA. This makes Alex a master of stealth.

Along with this, the developer has played with a lot of ideas to take advantage of Alex's mutated state.

"One of the key aspects we've focused on getting right with *Prototype* is the locomotion and agility of Alex Mercer. When you have ultra aggressive, fast-moving enemies steamrolling towards you in an open-world recreation of New York City, you simply need to move fast and be very agile," explains Bennisson. Radical has managed to achieve what it calls 'hyper-parkour grace' by taking into consideration how the AI would react to a superhuman, and getting the animation right so his fantastical movements don't look out of place. Making sure the controls were simple to understand and use was also a priority.

Obviously, with such a capable character under the control of the player, a lot of insane ideas are likely to be tossed around.





Leaping around city streets destroying stuff, and brooding on high places. Yep, it's a superhero alright.

On this, Bennison says that selecting the best ones came down to what backed up the developer's gameplay objectives and ultimately, what was fun.

"One earlier idea that did get cut was the concept of Alex being able to consume animals. It's definitely an interesting space to explore, though we had so much to consider in just the human-to-human gameplay that we realised this was maybe best left for a different time."

Radical has stressed that Alex will start off powerful, so none of this levelling stuff everyone else is addicted to. Alex will become more powerful over time, but you'll be able to throw vehicles, leap from building-to-building and run up walls right from the get-go. You can even combine Alex's abilities to create extreme setups – like protruding spikes from his stone form so enemies not only have a hard time damaging you, but hurt themselves in the process.

With words like 'parkour' and 'superhuman' entering the fray, *Prototype* has been described as a fusion of *Assassin's Creed* and *Crackdown* in the media. Bennison admits that open-world

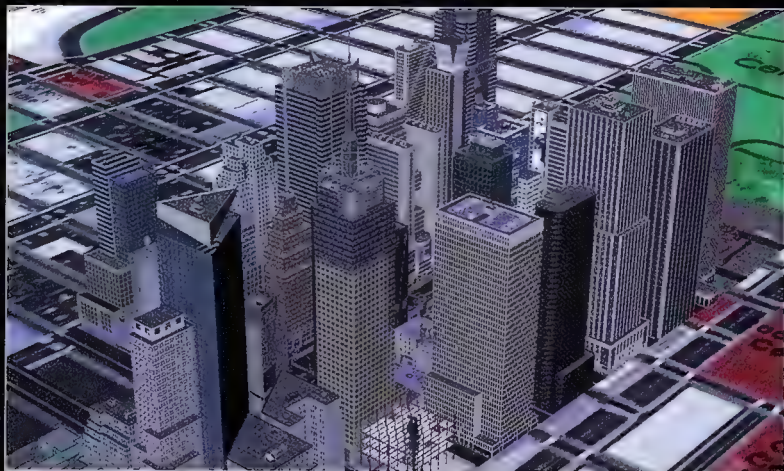


games are challenging to develop, but he also says there's 'plenty of room' for Radical to experiment with the 'gameplay tools' both these games have introduced, and *Prototype* will stand out as a unique creation.

Speaking of open-world titles and the difficulty of creating them, how has the developer approached the design of the game? Especially when you want players to know exactly what they can do and where they need to go?

"The first step is to make it extremely easy to understand and orient to your next objective, your potential secondary objectives and to understand the tools you have at your disposal to achieve them," says Bennis. "Open-world games definitely face the challenge of larger spatial consideration for the player to deal with – though we're feeling good with the amount of dos and don'ts picked up through open world games such as *Scarface*, *Simpsons Hit and Run* and *Hulk: Ultimate Destruction*. It's a larger challenge for sure, though there are some very good general principles already established to lessen that challenge for the player."

Building New York's skyline from scratch.



“The technology has been influenced by Radical's failures, as well...”

It's what's inside that counts

Prototype is built on Radical's Titanium Engine. According to Bennis, it represents over a decade's worth of experience and development, with the project beginning its life in 1995 as a rendering library. It's definitely come a long way since then.

"From a purely pragmatic view, the roots of the engine began when there were no viable middleware solutions and continued analysis since then has shown our choice to be financially justified given our business model," says Bennis. Looking back over the years, it's easy to see that the developer's view is justified. The engine is a fusion of the knowledge the team has gained from *Simpsons: Hit & Run*, *Hulk*, *Crash of the Titans* and *Scarface: The World is Yours*. Of course, the technology has been influenced by Radical's failures as well, but more for the lessons learned than anything physical.

As for specific features, the engine has ticks in all the next-gen boxes: complex shadows, per-pixel dynamic lighting and a day/night cycle, to name a few. However, Titanium's strengths are its streaming technology and multi-platform support. Having created *Hulk* and *Scarface*, streaming is refined to the 11th degree and players should expect a seamless experience as they run hell-for-leather down the streets of New York. As for its multi-platform capabilities, Bennis was happy to go into more detail.



"What is important is that a console SKU is not a simple port or afterthought, but rather that its strengths are exploited. For example, Titanium provides significant SPU support for the PS3. We did not create an engine for the Xbox 360 and then think about how to port the tech to the PS3.

"Don't get us wrong. There are many great commercial engines out there that have produced many jaw-dropping titles. We're not saying Titanium is better than they are." But as you can imagine, the familiarity of Titanium, its code and tools is in their favour.

You may have heard a bit of talk on *Prototype's* THX 7.1 certification. This term alone doesn't mean much on the surface, but Bennison was able to explain what the benefits will be for gamers.


"Since we spent a lot of time and effort capturing hours of true New York City soundscapes – from taxis blaring, people yelling, alarms going nuts on crowded street corners – it seemed the only solid option to recreate that immersion was to work with THX." Bennison says that THX was amazing to work with and while the certification process was 'detailed and fairly exhaustive', it worked out to be a great thing for both the game and the developer. And, despite the 7.1 moniker, players will be able to enjoy the pros of THX certified sound with a 5.1 or even 2.1 setup.

"*Prototype* will fully accommodate those system setups and we're working hard to ensure as much of the ambience is captured, regardless of system capacity," says Bennison.

Shaping the whole

Radical has made it clear that *Prototype* is the first in a multi-game franchise. We have no idea how many titles this will entail, though it's not a major concern as we have more than enough anticipation bottled up for the developer's first effort.

Bennison says there are plans for downloadable content, but *Prototype's* large world provides a dizzying array of expansion opportunities, so nothing's been hammered into the post-launch stone yet.

For now, keep your eyes open as publisher Sierra has the release date penned for later this year. 

CO-OP, WHERE FOR ART THOU?

For this feature, we interviewed Bennison a few months ago when co-op multiplayer was confirmed. Since then, Radical has announced that it's been cut. For completeness' sake, we've included Bennison's comments.

"From our research on this multiplayer modes and what is most requested by gamers, online co-operative play was the number one requested multiplayer mode," he says. "We're aiming to make the co-op gameplay a really visceral, high-energy experience that is made possible by unleashing two *Prototype's* onto the city at once." Bennison goes on to mention that the co-op would be a 'fun enhancement' to the single player experience.

We cried a little when we heard that co-op was cut, but we're confident the single player will be better because of it.

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Grand Theft Auto IV

David Hollingworth sells his PC, his PlayStation and all other games. After GTA, he needs nothing else.

There's a classic marketing phrase that I am sure you've all heard before. It's a classically hyperbolic piece of flim-flammy, and you can usually pretty much ignore it. But not this time. In all seriousness, if you only buy one game this year – make it this one.

Truth is, *Grand Theft Auto* is one of those rare games that's damned hard to review simply because there is so much to say – nearly all of it very good – and the last thing any reviewer wants to do is sound like they've lost all objectivity. But this is a game that defies objectivity: if you're at all invested in gaming, in the series, in clever gameplay mechanics or storytelling, this is a game that you will fall in love with from the opening credits.

That is largely down to the main character of this epic tale of crime, redemption and vengeance – Niko Bellic. At the same time he is the most fully fleshed out of *GTA*'s protagonists, while still being remarkably easy to imprint yourself on before entering the world of Liberty City. When we're introduced to him, Niko's just arrived on board a tramp steamer, looking for the American Dream, and hoping to hook up with his rich cousin Roman. It comes across a little too exposition-heavy, but when Niko and you discover that Roman might not have been telling the whole truth about his success in America, the elaboration pays off.

Roman is on the lowest rung of criminal society, running cheap-arse cabs out of a dingy garage

near the docks, and not at all the playboy he's promised Niko he is. The initial set up for the game's progression is therefore quite simple – help Roman with his low-rent jobs around town, which translates to simple driving missions, picking up people and cars, and exploring the city almost block by block.

Baby steps

It's hard to tell exactly what *GTA IV*'s greatest strength is, but if you pushed us we'd have to say this is it – the game's ability to deftly weave story alongside exploration and the ever-expanding

capabilities and mechanics you get introduced to. Over the first seven to eight hours – though with such an open game as this, your mileage will definitely vary – there's hardly a mission that doesn't expand the game's repertoire of what Niko can do.

Take, for instance, one of the first driving missions. Roman calls you up and asks you to pick up his secretary and her best friend from the station, and then drive them home. It's simple on paper, but it does a lot in terms of gameplay and story. We meet a new character, get a little bit more of Niko's background explained, drive into a new part of Liberty City, and get introduced to *GTA IV*'s contact mechanic. Thanks to this gradual opening of options and setting, you never ever feel in over your head. When you finally get hold of a pistol and the missions get a little tougher, you've already become familiar with your patch of the city, and navigating it, taking



advantage of the terrain and the places in it, is second nature.

One interesting decision the devs took was to not lock out sections of the city. It's possible to explore the whole of Liberty City from the get-go, but something we've found is that the unfolding of the story, the mood of each locale, along with the character of Niko himself, acts as a natural limiter on your movements. We actually didn't want to leave our little Eastern European ghetto until we had to, and that kind of tight integration of different elements of the game is simply amazing.

Movin' on up

As you progress through the early levels, the overall arc of the game's story and the depth of the new game begins to reveal itself. Like the great crime classics of cinema, such as *The Godfather* and *Scarface*, every character in the game is looking for the American Dream. So's Niko, ostensibly, but he's looking for something else, too. Without giving too much away *GTA IV* is a revenge tragedy, a story about the high cost of ambition and greed. Decisions you make will



– driving, shooting, dealing with the police – are present, of course, and more besides, but all of them feel much more real. Driving is now a very different proposition depending on your choice of car; each model handles differently in

“... he'll bleed a lot and writhe in agony, maybe fire off a random shot that plinks an innocent bystander...”

affect the ending.

However, since *GTA III*, the game's always covered similarly grandiose territory, and *GTA: San Andreas* offered up a supremely fleshed out story. Where *GTA IV* departs is the manner in which it matches the tone of the gameplay to the tale being told. The entire product has a much greater sense of verisimilitude, leading to a much greater sense of simulation.

All the classic aspects of GTA gameplay

nearly every area, from suspension and speed to survivability. On top of that, the damage model is supremely detailed – never underestimate the sense of joy you'll get from running over a fleeing gangbanger and then finding out you've been driving around for an hour with a perfect imprint of his spread-eagled body on your hood.

Gunplay has been similarly boosted, with the addition of a *Rainbow Six: Vegas*-like cover mechanic, and the ability to carefully aim your



shots at different body locations. Want to slow down that gangbanger instead of killing him? Put a round into his knee and he ain't going nowhere. He'll also bleed a lot and writhe in agony, maybe fire off a random shot that plinks an innocent bystander or causes a car accident.

The way you relate with other characters

GTA OVER THE YEARS



GTA



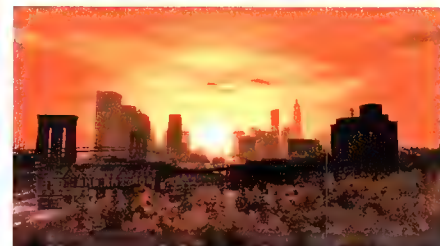
GTA 2



GTA III

The Grand Theft Auto franchise has come a long way since the first title caught the attention of gamers back in 1997. The tongue in cheek gameplay was certainly in place, though! GTA 2 kept the top down

perspective, but added a layer of polish when it was released two years later following a memorable ad campaign. Then, the radical move to over the shoulder 3D was heralded by GTAIII.



has also changed, and you'll need to work your contacts now to keep them happy. Call them up on your cell – another great addition to the gameplay – and ask them out on dates, to play pool, have a drink (which is the funniest thing ever), or whatever. Keep certain characters happy, and they'll become sources of income and offer you more jobs, as well as unlock further elements of the grand story of Liberty City.

Definitely hang out whenever you can with the Rastafarian dope dealer Little Jacob. He's fucking hilarious.

Livin' in the city

GTA IV's incredible level of realism would be nothing without the work of art that is Liberty City itself, and it really is a groundbreaking piece of, well, game design, artistic direction, and engineering. It may not have the spit and polish of the rendered cities in the dedicated racing games, but those cities are cold and dead affairs designed to be experienced only at maximum speed. Liberty City is something else again, possibly the most fully realised environment that the gaming industry has yet produced.

From the day/night cycle and weather, to the random conversations you'll hear on the street, you can spend hours simply walking around and discovering the place. On top of that there's now iconic radio stations (DJed by the likes of Iggy Pop and Karl Lagerfeld, to name just two of the great cameos in the game), which offer the sharpest satire the series has ever presented, hours of television to watch, as well as an in-game internet to browse. You can even register for dating sites!

There's a lot to do, like any GTA game, and like previous ones you can simply skive off the actual game itself and go for stunt achievements and other easter egg hunts, but the truth is you'll be just as likely to check out the local net café to email your mother and see what's happening in the old country as you will be to see if you can jump the freeway on a motorcycle.

A bigger world

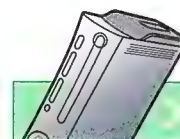
One of the local Rockstar types told us that if you only play the main story mission you can finish the game in about 40 hours. More average run-throughs apparently top the 100 hour mark,

and we've certainly sunk a lot of time in the game already. But, even when you do finish the tale of Niko Bellic, there's a whole world of multiplayer to explore.

There are nine modes, from the co-operative Hangman's Noose, where you must escort a criminal through the city while holding off the PD, to Race mode and more.

We previewed multiplayer on www.atomicmpc.com.au, so check it out in more detail there, but rest assured that if you thought the multiplayer aspect of the game was merely an afterthought that would never work, you're very wrong. The multiplayer alone is worth the game's asking price.

The fact is we're running out of words, and there's still so much unsaid. But that's not a bad thing – *GTA IV* is a game not only of revenge, but of discovery. Just like you need to discover Niko and Liberty City at your own pace, you need to experience the surprise of all that *Grand Theft Auto IV* has to offer yourself to fully appreciate it. News reports suggest that the game cost over \$US100 million to develop and bring to market – it's worth every cent of it.



Developer **Rockstar North**
Publisher **Rockstar Games**
Website <http://rockstargames.com/IV/>

VERDICT

Everything. 

Nothing. 

10.0
OUT OF 10





Alone in the Dark [Preview]

The classic horror series continues with a next-gen, physics-rich outing. David Hollingworth hefts his flashlight to check it out.

Who would have thought all those years ago that *Alone in the Dark* would prove such fertile creative ground? The 1992 horror game, so obviously influenced by the gothic works of HP Lovecraft, has since spawned four further games, culminating in the title from Atari and Eden Games we're looking at this issue. It's a direct continuation of the story, with the same character, Edward Carnby, set in modern day New York and Central Park in particular.

From the get go, it looks like dear old Edward's in a bit of trouble. As the game opens, so too do your eyes, revealing that you're lying on your side, dazed and near unconscious, surrounded by bad guys who just want to take you up to the roof and shoot you. As opening gambits to grab player attention go, it's pretty impressive.

Also impressive is the first gameplay element you're introduced to – the ability to blink. It might sound rather odd – and not all that exciting – but with a single button-press you can close your eyes in game, sending the screen black. There's method to this madness, though, as the only way you can clear your blurry vision in the opening sequence is by blinking. It's a neat effect, and forces you to either suffer blurry sight, but not miss anything, or blink for a moment and possibly

miss a vital clue or scene. Blinking can also reveal more esoteric secrets in the environment, but we'll leave that for you to discover...

Soon enough, though, your fuzzy-headedness clears; right about at the same time everything goes to hell, almost literally. From there it's a race through a burning collapsing building that neatly introduces the rest of the game's tricks, before you're plunged into Central Park and the game proper.


Immersion and realism is something that Eden Games has strived for with *Alone in the Dark* – the inventory and damage systems used in the game are a perfect example of this. Whenever you access your inventory, rather than getting the classic gridded box of stuff, Edward's POV looks down and into his open coat, to where all of his gear is arranged. It's essentially the same thing we're used to, from a game mechanics point of view, but it really does drag you further into the game-world – an important thing for a horror game.

Similarly, when you are hurt and need to treat the damage, the wounds are represented on your body. So you look in your coat – literally – pick some spray-on medication, and then target the spray onto your injured limbs.

The game is suitably moody, too, full of dark corridors and imposingly wooded vistas. The Twilight rendering engine can pump out some mighty fine textures and physics, from fire that actually burns along wooden and other flammable surfaces at a realistic pace to detailed interactions between physical objects. Those physical interactions then feed back into the gameplay, in scenes where, for instance, you must remove a live wire from a metal fence or pool of water. Sometimes it works very well, but other times you seem to be fighting the physics engine itself, and not the environment. It mostly works, and makes the environment you explore seem that much

more realistic and immersive, but when it doesn't it can be jarring and frustrating.

Then, of course, the big bugbear of all adventure games – the camera system and its myriad interactions with the third person action on screen. In most areas of the game you can actually switch to a first person view, though it does seem rather stilted compared to third person – at least in our preview build. For the most part, the camera movements are reminiscent of the cuts and pans of cinema, and well judged, too. But, again, they can go wrong, and one early ledge-climbing puzzle is an exercise in pure frustration as you're popped in and out of different views, or as the camera swings around turning your forward momentum into a sidestep. Not ideal on a ledge fifteen stories above the street.

Still, there's far more good than bad in the *Alone in the Dark*. If some of the issues can be ironed out before release, it might just be the next big adventure game. 



Developer **Eden Games**
Publisher **Atari**
Website **<http://www.centraldark.com/>**

VERDICT

Moody environments;
immersive gameplay;
semi-open world



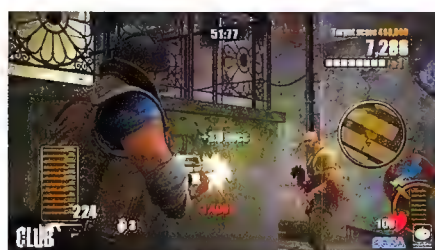
Some camera issues; not
always realistic physics



ANTICIPATION RATING

7.5
OUT OF 10





The Club

Any club that will let David Hollingworth in isn't worth joining. Or, for that matter... playing.

It's always great to see game developers innovating old genres, and when news of Bizarre Creations' *The Club* reached us, we were quietly intrigued. Taking a leaf or two from modern racing games like *Project Gotham Racing* (another Bizarre Creations creation – see what we did there?), *The Club* rewards players for stacking up quick kills and cool combos in a third person shooter. The plot's basic – rich people, apparently, like watching nameless bullet-magnets get shot up and you're one of the shining lights in the sport – but that, we hoped, simply meant the gameplay could shine...

What we've ended up with, however, is more of a dull glow that could desperately use a lot more plot to flesh out any reason for actually playing the game.

The bloodsport routine's nothing new, but that doesn't mean it can't be done well. *Manhunt* is a perfect case in point, that actually managed to shoehorn some pretty decent story in between all the shivving and plastic-bag-asphyxiating. *The Club* hints at greater depths of story – some of the eight characters you can choose from seem to have all manner of skeletons in their respective closets – but this never actually comes out in the game once you settle on one. Why is Finn getting beaten like a red-headed step child as the game starts? What's the deal with the pretty-boy twins? You'll never know.



Similarly, while you might expect that the game may come with some kind of twist that actually provides commentary on the morality of *The Club*, in reality you're plum out of luck. Once you finish the game – which is monstrously short – the only replay comes from being able to go through with different characters. It's an arcade experience taken to arcade extremes of transience and pointlessness, where the only drive to win is the beat the high score.

Which would be fine, were it not for the fact that the gameplay itself is as short-sighted as to the game's premise.

A typical level sees you needing to wrack up kills, to build your combo-rating, all the while maintaining enough pace to get to the next set of enemies before the aforementioned combo runs down. Headshots, close range kills and other trick-shots are all rewarded, and there are usually special combo-boosting targets ranged about each level.

All well and good, and you might think, with some clever level design – and the game does have some nice ones – that random spawns and weapon load outs might deliver some interesting gun fights. That is, if there were any randomness.

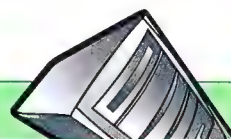
That's right, each level spawns enemies identically. This might be in an attempt to make the game more 'sporting', but instead it means replay value drops even further. Unless you're some obsessive compulsive who likes mapping out badguys and racking up every combo/kill/achievement possible in a game, in which case *The Club* might just be your next obsession.

The final nail in *The Club's* coffin is the fact that it's possibly the most lazy console port we've seen since *Kane & Lynch*. If you like playing PC games with your Xbox controller, this is great news, but for the rest of us it's a galling reminder of why our favourite platform is losing out to

consoles. Whomever oversaw the port didn't even bother removing the 'Press Start' instruction. There's not even any 'quit' option; you've got to Alt F4 to get out. Fail.

There's multiplayer, as well, but good luck finding a game.

The game at least looks good, and runs at a higher resolution than its console cousins. The problem with making the game speed-based, however, is that you can barely notice the settings, or the rag-dolling, or any other nice effects. It's all kind of wasted as you're forced to sprint through each level.



Developer Bizarre Creations!
Publisher Sega
Website www.theclubgame.com/

VERDICT

Better graphics than console versions; adequate sound.



Repetitive; poorly ported; repetitive; little depth; repetitive.



5.0
OUT OF 10



Fifa Street 3

David West takes it to the street with oddly proportioned football players.

EA's *Fifa Street* series is all about breaking the 'beautiful game' down to its bare essentials and jazzing them up to the Nth degree. Gone are apparently silly rules such as offside and fouls in favour of five players on each side performing the most over the top tricks in an urban environment. The third edition of the series is the strongest offering yet and offers up locations such as Oil rigs, playgrounds and rooftops just waiting to be climbed upon and back flipped off in order to...well basically to look cool.

The emphasis is firmly placed on this over the top trickery as opposed to the strategic and more realistic offerings of its big brother *FIFA* and the *Pro Evolution* series. This premise enables pretty much anyone to jump in whether they appreciate football or not.

While this simplified football is good fun, the execution is somewhat flawed and wastes a lot of the game's great potential. For an idea that relies so much on twitch movement, flowing passes and trick sets, the controls are not nearly responsive enough and limit what the player can do. Players move quite slowly and the general pace of the game is slower than sports fans might expect. Despite this, when it comes off, it really works; stringing a rapid succession of passes and flicks between players ended by a thundering bicycle kick into the back of the net is extremely satisfying and it's here that the game really shines.

Stringing these tricks together fills up the 'Gamebreaker' bar; when filled this gives



your team enhanced abilities for a limited time and, when utilised properly, can make you an unstoppable scoring machine. For a game aiming for the type of circus street football made famous in countries like Brazil, there is however a noticeable lack of tricks, and those that are in place can feel slightly artificial at times, with the ball feeling like it is on a string rather than being a fluid part of the action.

The core of the single player game is the challenge mode. In this mode you progress through matches by achieving set tasks, like scoring a set amount of goals in a given time frame, scoring using only headers, volleys or the gamebreaker power ups. These are played against teams broken down into player groups such as stocky, fast, and young, with each providing a different challenge based on their strengths and weaknesses. The single player is quite shallow, though, and gets somewhat repetitive as you progress to the latter stages.

Local and online multiplayer is great fun and adds to the foundations laid in the single player game. It might be great to mix it up with a human opponent running up walls and out tricking each other, but the pacing and control issues hold it back from being the all-in trick and brag fest that the game could have been.

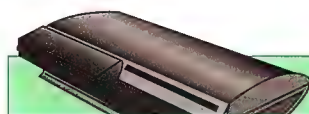
Fifa Street 3's visuals, at least, match the game's over-the-top leanings. The exotic playing locations are visually interesting and unique; they're well realised and contain a fair amount of depth and background detail that really suit each location. The more than 250 player models are stylised representations of their real life counterparts and look quite fresh and in tune with the rest of the game. Peter Crouch, for example is *really* tall and lanky while players such as Viduka and Rooney look like they've been plucked out of some weird cell-shaded version of the Madden series.

In game sound effects are average and pretty much what you would expect in terms of grunts,



squeaking shoes and power up sound effects. In typical EA fashion the soundtrack is quite strong and goes along with the on field action admirably.

Overall *Fifa Street 3* is a solid, fun game that is still a story of wasted potential. It is a vast improvement over the first two games, though, and with tweaking of the game's pace and control, the inevitable future revisions could really hit the mark.



Developer EA Canada
Publisher Electronic Arts
Website www.fifastreet3.com/

VERDICT

Exciting goal scoring;
Good multiplayer fun



Unrealised potential;
iffy pacing and controls



6.5
OUT OF 10



Wipeout HD [Preview]

It's back to the hover track for David Hollingworth, but this time with the latest PS3 iteration of the classic franchise.

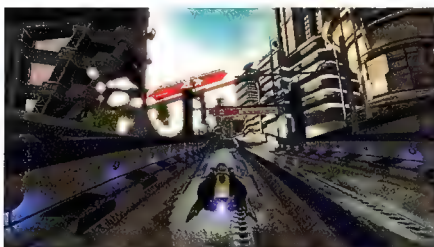
It must be racing month at Atomic HQ. Josh has been drooling over Ferraris and Porsches in *Gran Turismo 5: Prologue*, and now it's my turn behind the wheel. Or, more accurately, control system.

I don't think the hover racers in *Wipeout* actually have steering wheels.

Wipeout HD is the PS3 game that many of us have been waiting for. It's long been said that the platform lacks a real 'killer app', like *Halo* or *Wii Sports*. Well, if the amount of people who have looked at *Wipeout HD* and simply drooled or tried to steal the controller from me over the last day or two are anything to go by, PS3 – and HD television – sales are about to go through the roof.

On the whole, if you've played one *Wipeout* game, *Wipeout HD* seems to have nothing really new to offer, at least on the surface. You pick your team, race your races, and bop along the techno-bloody-techno-darling; but if you think that's all there is to the game, my God, you're so wrong. There are simply no words to describe what it's like in a full HD environment – our testing studio isn't even wired up with 5.1 sound yet (which the game does support), and it was still near-transcendental.

The preview we've played has four tracks, the first two flyers in campaign mode, all eight ships and all offline game-modes. There's going to be a lot more in the final game, of course, but even as it stands I think I'd pay money for preview.

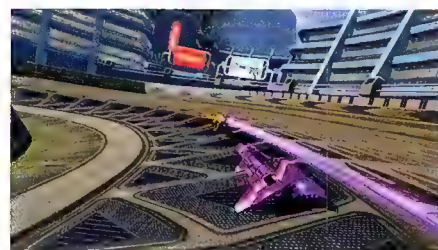
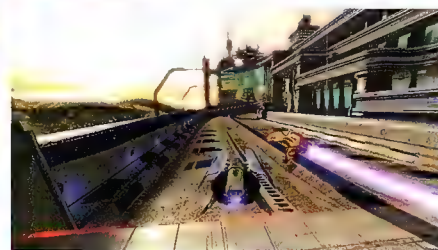


The Zone mode alone would be worth price of admission.

To progress through each 'grid' – not unlike *Wip3out Pulse* on PSP – you must amass points and medals. You also only start with so many races and race modes unlocked on the grid, and must score medals to unlock more. However, we've pretty much settled on Zone as the single best thing ever of high-speed racing.


It's like a combination of *Tetris* and an intense acid trip. You must clear zones on the track to win, and you've got as long as your shields last to do it, and as you clear each zone your ship also accelerates faster and faster. Sounds simple, but rather than the ultra glossy and realistic tracks you've played on up until now, the zone tracks are colour-washed visions that look like something out of William Gibson's fevered imagination of Cyberspace. Add in a track that is literally built out of graphic equalizers pumping in time with whatever music you're listening to (we heart custom playlists and the grand-daddy of all *Wipeout* tracks, FireStarter) and colour shifts every time you pass a certain point in the race, and you end up with a game that will have a room of people literally ooh-ing and aah-ing along with the player as they zen out completely.

Aside from that, the improved graphics add a level of gritty realism the game hasn't really had until now. Rockets leave smoke trails across the track, ships explode in bits of flaming metal, and the controls are twitchier than ever. The pre-race fly-bys show off the fully-detailed cockpits to best advantage, and every surface is bump-mapped to within an inch of its glorious life. The 1080p output is flawless, running a super smooth 60fps. And, as always, *Wipeout HD* offers an unrivalled sense of speed and mayhem, with every race being a unique event thanks to the random weapon (and there are three new engines of destruction added into the mix – the Repulser,



Shuriken and Leach Beam) selections and opposing driver AI.

There are other toys to unlock, such as new colour schemes for your ship, but unlike some games, where getting achievements and getting shiny badges is the main reason to keep replaying, in *Wipeout* you keep playing because the gameplay is so damn perfect.

And this is all before we even get to online competitive play. The full release will have eight player competitive races, as well as a team vs team mode. The release date for the game has slipped once or twice before, but it's so far looking solid for a mid-year release. Bring. It. On. 



Developer **SCE Studio Liverpool**
Publisher **SCEE**
Website **<http://wipeouthd.com/>**

VERDICT

Slick graphics & design;
fast races; Zone mode. 

Real life simply looks boring
after playing a Zone race
for three hours straight. 

ANTICIPATION RATING

9.5
OUT OF 10



Gran Turismo 5: Prologue

Josh Collins gets a little sideways in the F430 and loves every thrilling second of it.

GT5: *Prologue* is the latest in a series built on a foundation of excellence in fundamentals such as realism, immersion and exhilaration, and the first game we've come across that thoroughly gave us a reason to want to buy the PlayStation 3 console – until now it's been the lackluster competition to the Wii and 360. But now, armed with *GT5: Prologue* and Blu-Ray's crushing defeat of HD-DVD, there is a new breath of life for the PS3.

GT5: Prologue has a lot to stand up and be accountable for. For one, the title is aging and, as the name suggests, this is part of the fifth incarnation of the series. We say 'part of' as it is the prologue – not the full game but an insight into what is yet to come and a taster to whet the fans' appetite.

As a series ages there is the danger of becoming stale. Thankfully for *GT5: Prologue* – and the many fans of the series – the latest incarnation manages to shy away from being a replica of the past with flashy lights and mirrors attached. Instead, the fifth generation is looking to be a stunning insight into the dreams of Kazunori Yamauchi, the original designer and founder of the series.

We mentioned one of the fundamentals of this title is the recreation and realism of the driving experience. From the paltry power, or the lack thereof, of the Suzuki Cappuccino through to the sheer acceleration, raw grunt and undeniable beauty of the Ferrari F430 as you unleash the

4.3L V8 and the 400BHP through the Suzuka Circuit, there is something for almost every driving enthusiast.

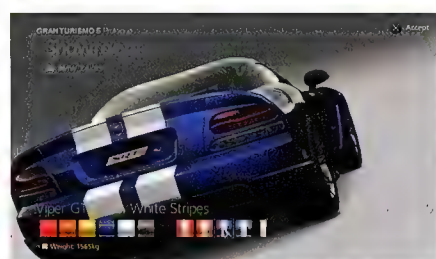
As mentioned, *Prologue* is but a snippet of what's to come in the full release. That said, you still get an experience that outweighs many of the racing titles currently on the market. Restricted at this stage to six tracks, playable in both normal and reverse directions, 70-odd cars and a handful of driving styles and events, from full grid races to time trials, drift challenges and other special events, the list just goes on.

These all combine to create an experience that certainly has sufficient gaming life to not only unashamedly request the asking price of a regular full title but at the same time still leave the avid *GT* fan crying out for more.

There are gripes; the lack of a damage model, effectively allowing two cars to hurtle head-on at maximum speed, only to come to a thudding stop where by each driver can then politely wave to one another and continue on their way is just one of them. This is then combined with a system to maintain racing integrity of sorts by handing out time penalties for taboos such as hitting a barrier, cutting a corner/making a shortcut or ramming another vehicle. This is surely good, right?

We found frustrating flaws in this pseudo referee. If you happen to cop sufficient grass on a straight you peculiarly obtain a shortcut penalty, even though it's already slower than the brisk tarmac.

The lack of a damage model has often led to many flame wars. Does it subtract or supplement the simulated driving experience? In *GT5: Prologue*, at least, the damage model will not and does not make an appearance. However it was recently announced that the full *Gran Turismo 5* will feature a damage model. How this will influence the overall experience is one many reviewers and fans alike are waiting to see – we're certainly interested.



One of the key areas that has given such a loyal following to the *GT* series is the depth of the car tuning. This has fallen to an ugly low in *GT5: Prologue* and while this may simply be an exception for the *Prologue*, we pray that the full *GT5* has more to offer. At this rate, *Forza 2* is the pick for the true tuning aficionado.

With what can only be described as a lifestyle channel attached to the game in the form of *Gran Turismo TV*, there really is no driving simulator like *Gran Turismo 5: Prologue*. It's that simple, even with the flaws. There are other driving and racing games, but *GT5: Prologue* has truly evolved. The *GT* series has gone that step closer to being a life and a culture, just like driving itself. (E)



VERDICT

Unrivalled graphics; many game modes; nothing but the race



No damage model; harsh penalty system; not the full game



9.0
OUT OF 10





Race Driver: Grid

Josh Collins can't help but to feel that Grid is having an identity crisis.

Race Driver: Grid, or simply Grid as we prefer to call it, is Codemasters' foray into the racing genre. Coming from the same stable as Colin McRae DiRT and TOCA Race Driver 3, the title has good heritage and endeavours to continue the high standard set by its well received predecessors.

What better way to continue building a strong wall than by using the same foundations, at least in game programming terms. The title is based on the Ego engine, an updated version of the Neon engine used in Colin McRae DiRT. In DiRT the engine was restricted to day light racing, but full night time racing has been added as well as a full grid of 20 vehicles – that's four more than the 16 available in Gran Turismo 5: Prologue.

With the developers touting a racing game actually about racing, you have to wonder what they believe is lacking from other titles. Damage, apparently. To address this, Codemasters has spent the last 12 months focusing on and refining the crashes and general car damage due to the

belief that it is an integral part of racing.

With car deformation a fundamental part of what makes Grid unique, so much so that it seems rather... overdone. To the point that the game felt like it had shifted from a racing game into a circuit enclosed dodgem mess. At best you might at least call it a demolition derby.

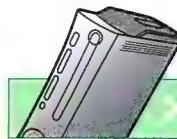
Focusing on the experience, thrill and aspirations behind racing, the team at Codemasters put in considerable efforts to create a believable, enjoyable and challenging AI. The AI is said to have the ability to determine the appropriate course of action depending upon the speeds travelled, surrounding vehicles and the actions of the surrounding vehicles. It's said that to make it believable the AI has the potential to screw up and send the car careering into the gravel pit or, worse yet, be sent flipping off a tire barrier before floating back into the racing line in mid-air.

With so much promised, we were let down and frustrated to find the AI to be annoying, often favouring piling into your car or tagging your

bumper instead of passing smoothly under breaks.

Grid can't match the likes of Gran Turismo 5: Prologue for car count, much less let alone the full 700+ seen in Gran Turismo 4. But in an effort to instill confidence in those looking for a distinctive and intimate racing experience, Codemasters has vowed that even though the title only features 45 unique cars, each one was specifically chosen. Furthermore, the cars included are solely racing cars and selected for being the best in their particular classes – no road goers here. What we found though, even with teams such as the well respected Top Secret, was that the game still lacked the finesse of the likes of Forza 2. To add to our disappointment, each car felt extremely similar.

At the end of the day, if you want a racing title, there are better options available. If you've got an Xbox 360, grab Forza 2; if you have a PS3, get your hands on Gran Turismo 5: Prologue; if you're looking for a PC title, although it's starting to age, GTR2 is still a great game and rest assured GTR Evolution isn't far off.



XBOX360

Developer Codemasters
Publisher Codemasters
Website www.racedrivergrid.com

VERDICT

Detailed damage model; advanced AI



Cars feel samey; advanced AI is a jerk

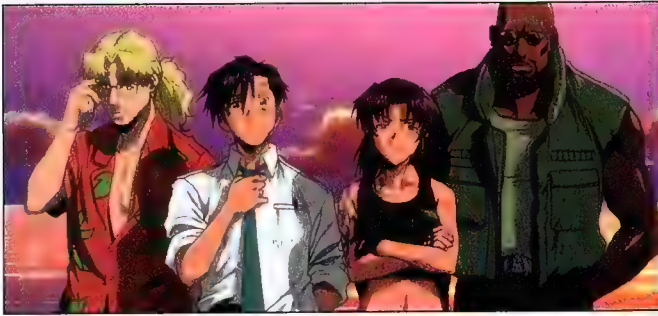


6.5
OUT OF 10



CULTURESHOCK

Everything you need to know about geek film, music and literature.



Black Lagoon, Volume 1

MOVIE

Directed by Sunao Katabuchi
Starring Maryke Hendriks, Hiroaki Hirata, Tsutomu Isobe, Daisuke Namikawa
Distributed by Madman Entertainment

It's kind of refreshing to find an anime series that doesn't have cyborgs, magical girls, mecha or samurai. Not that there's anything wrong with those things – trust us, we love our magical mecha-women with katanas – but it's nice to see an action anime that can be gritty and interesting in a more modern and relevant setting. And boy, does *Black Lagoon* have grit in spades.

Set in and around the waterways of Southeast Asia, *Black Lagoon* follows the adventures of a crew of modern day pirates who hire themselves out for odd jobs like kidnapping, stealing and generally causing nautical mayhem. The first disc essentially introduces us to the main characters – like the hyper-violent gunwoman Remy, known as 'Two Hands' for her skill at two-fisted pistol mojo – who in the course of the episode find themselves taking on a new crew member, a Japanese salaryman who's been abandoned by his corporation.

If the show feels familiar, then it's likely because it seems to mirror the basic premise of *Cowboy Bebop* rather closely. However, this is no bad thing; *Bebop* was an excellent series, and *Black Lagoon* is shaping up to be similarly involved, already hinting at larger story arcs and character development.

The South Seas setting also helps set the show apart, and the referencing of many real world groups and causes only helps further separate *Black Lagoon* from other girls-with-guns anime. We'll definitely be keeping up with the show, and given it has already run to two seasons in Japan, that means a lot of happy nights in front of the TV for fans of the series. **DH**

score **7.5**
OUT OF 10



Iron Man

MOVIE

Directed by Jon Favreau
Starring Robert Downey Jr, Jeff Bridges, Terrence Howard, Gwyneth Paltrow

Comic heroics can be hard to treat well on the big screen. It all comes down to the treatment the story gets, from the manner in which the actors hold themselves while delivering jargon-thick lines to the ease and confidence of the director handling the action itself, not to mention the difficulty of acting alongside and directing effects-heavy sequences. Iron Man has a mess of super-science jargon, American patriotism, difficult to like characters and some whizz-bang effects, but for all that it's the human scenes – especially pretty much every scene with Robert Downey Jr's Tony Stark – that remain longest in the memory. Downey Jr and director Jon Favreau have done a great job.

Of course, there's a goodly amount of CGI flying about as well as blowing, punching and generally busting shit up. But Favreau never allows it to dominate the story. Like the good X-Men movies, this is very much a story about good and evil that just happens to have giant robots and powered armour. Some of the effects shots do seem a little rushed, but for the most part you'll be too busy drooling over the rippling control surfaces of the Iron Man armour or the details in the holographic displays that Stark uses to refine his designs to really notice.

But, more than all of that, the one thing the movie has on its side is that it's unashamedly funny. Downey Jr's Stark is practically Dean Martin-esque, flitting from Vegas casino to cocktail party with ease, a woman (or women) at his shoulder at all times. Sure, the gravitas that all superhero stories thrive on is here, but not at the expense of having a good time. (see the full review online at www.atomicmpc.com.au) **DH**

score **8.5**
OUT OF 10

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Make me a monkey king

Intel carries a big, small, tiny, enormous and medium-sized stick. Hur hur.

So there I was, at the Intel Developer Forum in Shanghai, hobnobbing with Intel honchos Ronak Singhal, Pat Gelsinger and Anand Chandrasekhar... Sorry, I just had to brag for a moment.

The best moment of my IDF was sitting next to an NVIDIA architect during two talks (one in-depth talk on Nehalem architecture, the other an in-depth talk on wireless displays) and noting when he expressed himself with, variously, "tsks", "pffts", headshakes and sniggers. It's almost like there's a rivalry there.

The downside was that no-one spilled the beans on Larrabee, Intel's multicore graphics thingy. I can't call it a GPU, because Pat Gelsinger insisted it's not a GPU, though he wasn't forthcoming with much more detail than that. Dammit.

But I did, as noted above, get some details on Nehalem. Which brings me back to the Monkey King. The way Intel tells it, Nehalem makes us all Monkey Kings. Yes, Monkey, as in Monkey Magic. Go watch episodes on YouTube if you're not familiar. I'll wait.

The legend tells that the Monkey King had a staff that he could shrink until it was small enough to hide in his ear. Conversely, the staff could be enlarged for riding like a brookstick. Turn it into a lever large enough, and he could probably move the world.

The Monkey King's staff, then, is a metaphor for Nehalem. Nehalem architecture, you see, is used for everything from the tiniest sub-notes right up to multi-processor supercomputers. Shrink, expand. And that meant every person who came up on stage to chat with Pat during his keynotes also got a red and gold staff. It was a bit hard not to giggle, given some of the phallic overtones: here, dude, have a staff – it's immensely powerful and expands as needed!

As a geek, though, I was more interested in finding out what makes Nehalem specifically able to be used for everything from sub-notes to supercomputers, in detail (and I'm more interested in why you didn't bring me a staff back – *ed*). This was why I was at the talk with the aforementioned NVIDIA architect.

The answer, it appears, is mostly caching. And Quickpath.

In Nehalem, the same core is used for tiny subnotebooks and multiprocessor supercomputers, but aspects such as the integrated memory controller and cache – which Intel terms the 'uncore' – are

adapted to suit different members of the Nehalem family. The over-riding design principle is low latency, high bandwidth and scalability.

In practice, that means a whole raft of smaller changes, which I sadly don't have space to detail, and a few major ones.

Nehalem has second level cache private to each core, and third level cache that's shared across all cores, whether there are two, four, six, eight or more. The third level cache is inclusive – any address that lives in first or second level cache also exists in third level cache. An extra bit of tech – called 'core valid bits' – tells you which core the data is on. That way, any instruction sent from a core to third level cache can't be lost – you can track it back to the right die and the right core. This saves lost or misdirected instructions, which helps immensely with latency. There's a bunch of other tiny improvements that add to this basic aspect.

That covers multicores, but there's also multiprocessors to consider. Nehalem has moved from front side bus architecture to Quickpath Interconnect (QPI) to tackle that. QPI transfers 6.4GB per second, and there's now an integrated memory controller per processor, and three DDR3 memory channels per socket. Memory bandwidth galore!

For a two processor setup, there are two QuickPath interconnections per processor – one from each CPU to the Tylersberg-EP chipset of QPI, and one from each CPU to the

other CPU. A four processor setup has four links per socket – one to each of the other CPUs, and one from each to the chipset. That way, communication between processors and from processors to memory is always super high bandwidth. The links increase in number as the processors do.

Which all sounds pretty cool to me, and I can't wait for Nehalem to land on my desk and find out just what it translates to in practice...

I think my Monkey King staff has grown just thinking about it. I'll be in my bunk.

Zara Baxter knows that the word honcho is not Spanish, as it sounds, but Japanese; you can email her further surprising facts at zbaxter@epcauthority.com.au



“ This saves a lot of misdirected instructions, which helps immensely with latency. ”

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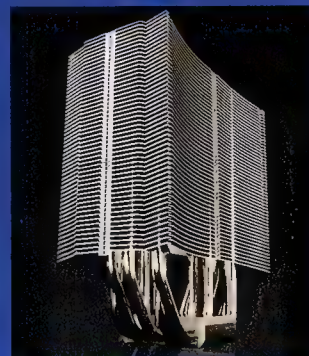
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TECHNIQUE

HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

Ron Prouse, as you may know, is a madman. There is, however, method to his madness, and we delve ever deeper into that method this month as we reach the halfway point in his construction of the world's first exercise bicycle-based gaming peripheral. You really do have to see it to believe.

We've also got another look at Windows Home Server, this time focusing on how you can take advantage of Remote Access to get at your files

anywhere you can find a web browser, as well as covering a range of add-ons you can find to get even more functionality out of this excellent software.

For those looking to better themselves and their chances at a stellar education and a tops career, we've also got Atomic.edu. This month, Chris Taylor looks at the advantages in familiarising yourself with coding languages before you actually start your 'proper' education. Enjoy!



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Stephen Reeves gets into the nitty-gritty of accessing your pictures, movies, music and whatever else you've got stored on your WHS remotely.

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We're getting there, and the racing seat is starting to really come together. Ron Prouse is already dreaming of that first lap...

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Dan Rutter gets his brain on.

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Two heads may be better than one. One of Logan's, anyway.

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DIFFICULTY **INTERMEDIATE**

Windows Home Server – Remote Access

Stephen Reeves helps us set up remote access to important files. Access your favourite pics, movies and more anywhere!

Suppose you want to hook Grandma up with shiny new pics of her grandchildren, or she wants to show you pics of her roses or macramé creations. With Windows Home Server, this is easy as pie (mmmm, pie...).

This tutorial will look at implementing the remote access features of Windows Home Server, either on a pre-built system from an OEM vendor or on a machine you've setup yourself as a System Builder. We'll also look at some popular add-ons and applications to build up your own server's functionality.

The Meat!

Windows Home Server includes a few features that make remote access easy. UPnP compatibility, Windows Live Custom Domains, Remote Access Website, User Account management and Shared Folder permissions.

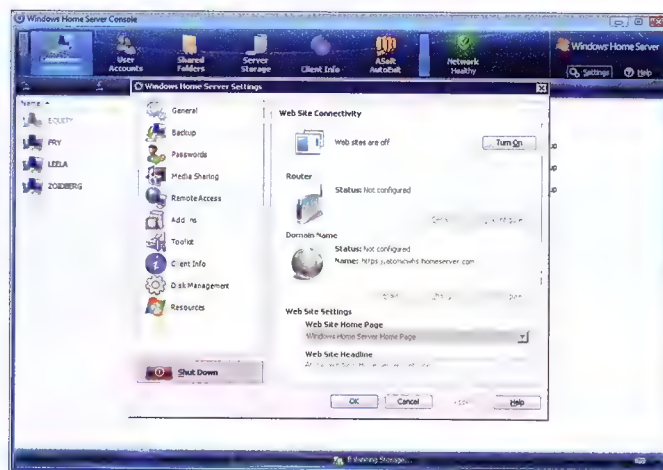
UPnP is used to set up port forwarding on compatible routers without the need for user intervention. If your router isn't UPnP compliant, or you don't wish to use UPnP, you can simply forward the two or three required ports to your Windows Home Server.

Windows Live Custom Domains are used to give easy remote access to your Windows Home Server anywhere in the world, even if you have a dynamic IP; you'll need a Windows Live ID to obtain a Windows Live Custom Domain. Included with your Custom Domain is a secure certificate issued by GoDaddy, so you can have assurance that your remote access is secure.

User accounts can be setup on Windows Home Server and given access to the remote access website as needed. User accounts with remote access require a complex password for extra security.

In combination with User accounts, you can set shared folder permissions based on what you want your users to access – either no access, read only or full access.

You can create individual logins for your family and friends, or provide a generic login and password so they can log on and view your photos and files,



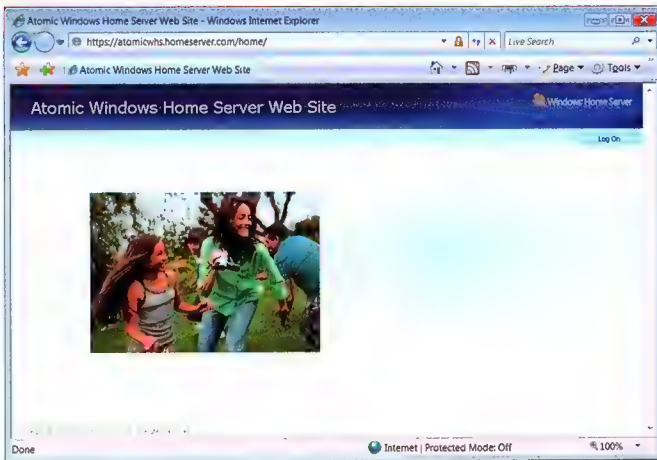
▲ Windows Home Server Console – Remote Access Settings.

and upload their own, depending on the access you give them.

If Gran doesn't need to see your collection of goat pictures, simply don't give her access.

Remote access is provided entirely through an internet browser, and some features are only available when using Internet Explorer and ActiveX controls.

Some patches relating to remote access have been issued since the original release of Windows Home Server, so it's important to make sure you've installed all applicable patches before proceeding. In addition, Power Pack 1 (when released) will have more changes to the remote access features.



▲ Windows Home Server Remote Access web site.

Setting Up Remote Access

There are a few steps required to set up your server for the first time to enable remote access. As we said, you'll need a Windows Live ID first to setup your custom **homeserver.com** domain.

1. Open the Windows Home Server Console by double-clicking the Connector Tray icon.
2. Enter the Windows Home Server password.
3. Click on the Settings button to open Windows Home Server Settings.
4. Click on the Remote Access tab in the sidebar.

Web Site Connectivity

5. Under the Web Site Connectivity heading, click the Turn On button to turn the websites feature on.
6. At any time, you can turn your websites off by clicking the Turn Off button; all your settings are held should you wish to turn them back on again.

Router

7. Windows Home Server should start trying to automatically configure your router for remote access. Click the Details button for progress.
8. If the automatic configuration fails, you will need to set up port forwarding on your router manually.

“The computers page lets you use remote desktop to access your home computers...”

Domain Name

9. You can then set up your domain name through Windows Live Custom Domains. Under the Domain Name heading, click the Setup button to start the Domain Name Setup Wizard.
10. Complete the Wizard using your Windows Live ID, and choosing the domain name you wish to use. If the process was successful you will be given the link to your site.
11. You can check the status of your router or Custom Domain at any time by clicking on the appropriate Details... button.

Web Site Settings

12. Set the home page to either the Windows Home Server Home Page or the Windows Home Server Remote Access login page. This is really only

useful if you are running a different home page.

13. Enter your Web Site Headline (Page Title).

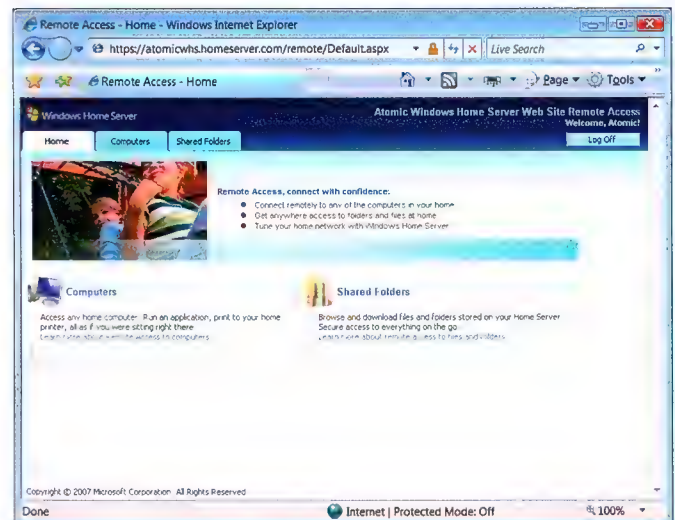
At this stage, you can only choose to enable or disable remote access for your users, but in Power Pack 1 you'll have more control over what they have access to. Take a squiz at the Power Pack 1 section below for more information.

Users with remote access enabled will require a Strong Password for security purposes. Strong passwords are at least seven characters long and contain at least three of the four types of characters: upper case letters, lower case letters, numbers or symbols. The Guest and Administrator accounts are unable to log in to the remote access website.

Connecting to WHS via the net

Connecting to your Windows Home Server is as simple as putting your Windows Live Custom Domain into your browser – for example, **http://atomicwhs.homeserver.com/** – and you end up on the home page of your server. To use the remote access feature, select Log On, then enter your username and password in the provided boxes.

As long as you enter the right credentials, you will be presented with the Remote Access Web Site, which consists of three pages, Home, Computers and Shared Folders.



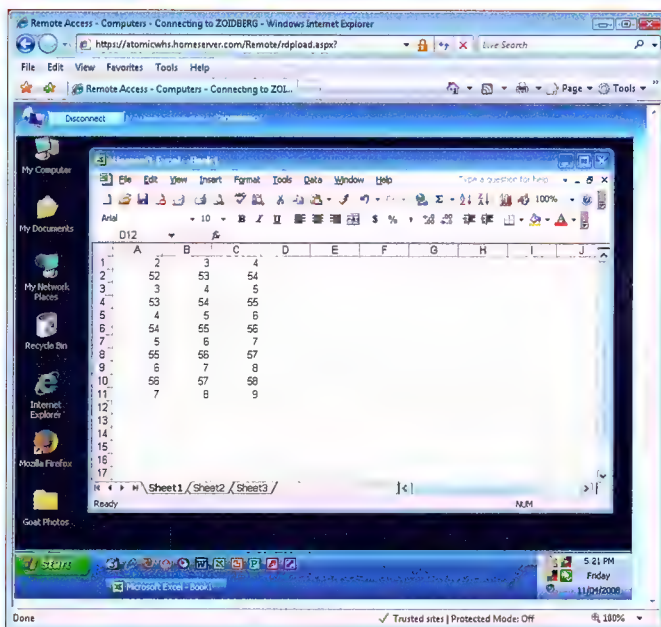
▲ The Windows Home Server Remote Access Website in all it's glory. Here, it's on the Home page.

The Computers page lets you use remote desktop to access your home computers as if you were logged into them locally. The advantage of using Windows Home Server to do this lies in the use of a single port for remote desktop. Rather than requiring separate ports for each machine, all remote desktop sessions use port 4125 as an RDP Proxy.

The Shared Folders page gives you access to the shared folders on your server. You will only see folders you have read or read/write access to. Files on the server are indexed by Windows Desktop Search, and this is often the easiest way to find your files. Across the top of the Shared Folders page is the breadcrumb trail, so you can keep track of where you are, and move back to higher folders easily.

Downloading files is as easy as selecting the file or files you wish to download, and these will be zipped up into a single file and downloaded for you. Power Pack 1 will give you the ability to zip the files into a self-extracting executable zip file (.exe) as well.

To upload files to the server, navigate to the folder you wish to upload to and click the upload button. In the dialog box provided, select the files you wish to upload and then click the Upload button to finish. You will see a progress display while the files are uploaded.



▲ A remote desktop session in action.

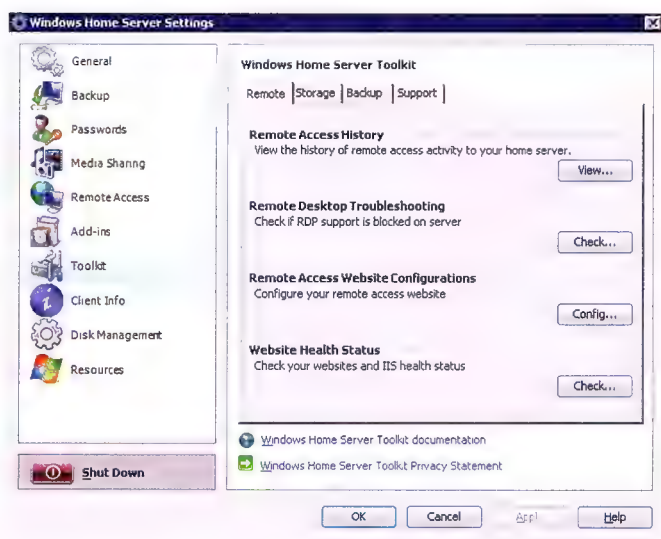
Using Remote Desktop

Remote access to your Windows Home Server is through your internet browser. We'll be using Internet Explorer in this tutorial, as an ActiveX control is required for the Remote Desktop feature.

Installing the ActiveX control requires you to have administrative rights on the computer you're accessing the server from. The URL of your site will also need to be added to the trusted sites list.

Clicking on the Computers tab of your Remote Access Web Site will bring up a list of connected computers, their name, operating system and whether they're available for connection. Only Windows XP Professional, Windows Vista Business, Enterprise and Ultimate operating systems can be accessed by remote desktop.

Clicking on an available computer will bring up a dialogue box asking for remote desktop settings, such as connection speed, screen size and connecting to remote devices. You can adjust the various settings to suit your connection speed.



▲ Windows Home Server - WHS Toolkit - Remote Tab.

Media Streaming

Media streaming via the internet is not supported out-of-the-box, but there are add-ins available for you to accomplish this. See the add-ins section below for more information.

WHS Toolkit

The WHS Toolkit is a free add-in from Microsoft that has a few tools to keep your remote access website in good condition.

You can view Remote Access History, which shows you who has logged onto your site and when; Remote Desktop Troubleshooting will try to find any problems with RDP on your server; you can configure the Remote Access Session Timeout value, which by default is set to 20 minutes. And finally, you have a tool to check the health of your websites and IIS, and a tool to restart IIS from the console.

Power Pack 1

Not many first version releases go completely smooth, or promise all the advertised features. Microsoft is releasing Windows Home Server Power Pack 1, which will fix some bugs, add new features and introduce some welcome changes to the remote access website.

Firstly, you will have the ability to restrict the tabs that your users can access on the remote access website – either the Shared Folders tab, the Computers tab or both. Useful if you don't want people to see or login to the computers that are connected.

Secondly, you'll have the ability to view thumbnails, useful for your photos and image files. You can view the thumbnails and only download the images you want, rather than downloading them all at once.

Thirdly, you will be able to upload files by simply dragging and dropping them in the provided box, rather than selecting files in a dialog box. There are add-ins available to do this currently, but they will be redundant with PP1.

You can use IIS to add your own sites to Windows Home Server. Even Apache...

Useful Add-ins for remote access

So, Windows Home Server comes with quite a few features out of the box, but what if you want more, like a customisable website or the ability to stream media? Then you can simply install add-ins, which add extra functionality to your server.

Or you can install applications directly on your server; there are guides online to help you through some of the pitfalls involved in doing this. Following is a list of common add-ins and applications that can extend your Windows Home Server's remote access functionality.

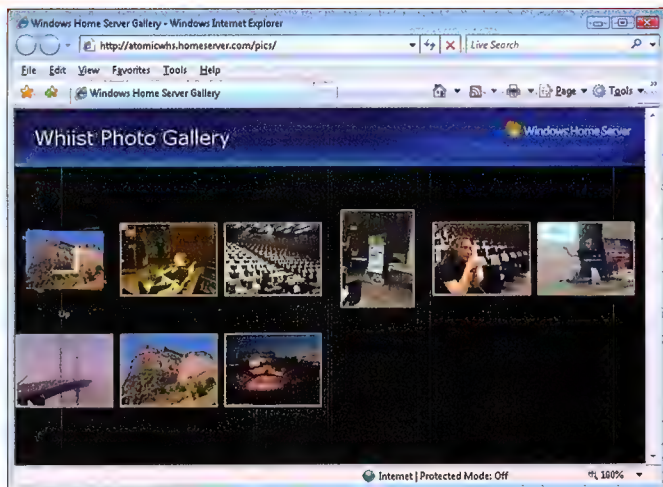
IIS 6

Internet Information Services 6 is included with Windows Home Server, as it's part of Server 2003. The remote access feature relies heavily on IIS and some proprietary coding to give you access to your shared files.

You can use IIS to add your own sites to Windows Home Server. You can even install Apache alongside it; although doing that is out of the scope of this tutorial, there are tutorials available online. PHP is also a popular addition to Windows Home Server, as there are a lot of PHP-based Content Management Systems and blogging applications available.

Sharepoint 3.0

Sharepoint 3.0 is a simple Content Management System, and it's easy to



▲ WHIIST. AKA, Windows Home Server ISS toolkit.

setup on your WHS, bearing in mind that it can't use port 80, but any unused port over 1024 should be fine. Sharepoint simply installs and adds itself to IIS, and you can customise your site to your heart's content. Guides are available online on how to do this. Sharepoint 3.0 requires .NET v3, which, unfortunately, may clash with other add-ins. You'll need to try and test this on a test server first.

Whiist – Windows Home IIS (Internet Information Services) Toolkit

Whiist was one of the earliest add-ins made for Windows Home Server and is one of the best. It's been designed to easily add website functionality to your Windows Home Server. It's simple to make private and public websites, and all your users (even remote users) can have their own page if they wish. There's a nifty photo album creator included, which removes a lot of the coding required to display your photos on a web page.

WebGuide for Windows Home Server

WebGuide is a popular media streaming tool, originally designed for Windows Media Centre.

WebGuide for WHS FREE is an add-in for Windows Home Server that lets you remotely access and stream your media files, Music, Photos and Videos, with adjustable quality, depending on your connection speed. It can even stream to compatible Windows Mobile devices.



▲ Webguide 4 for Windows Home Server.

If you have a compatible TV tuner card installed, you can use the TV recording and scheduling tools to record TV shows to your Windows Home Server, or you can even stream live TV.

Orb

Orb, while not specifically designed for Windows Home Server, is suited to the always-on nature of the server.

Orb sets up channels that stream files from your server to a player on Orb's website. You can only view these channels by logging into <http://mycast.orb.com>. You can give access to other users by adding them to your account. Any web browser is compatible with Orb, and you can even permalink files on your website.

With appropriate hardware, Orb also supports streaming live TV and webcam footage.

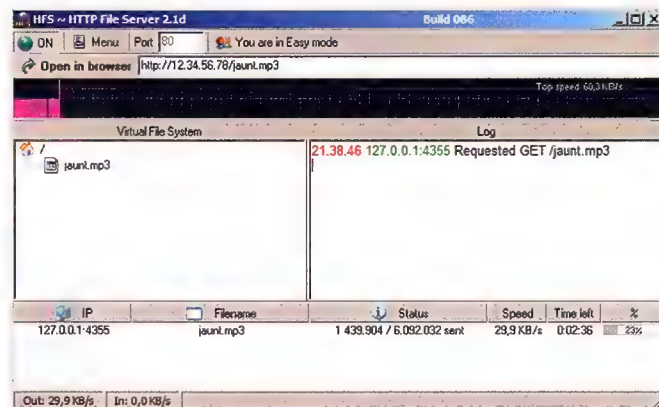
HTTP File Server (HFS)

HTTP File Server is another freeware program that wasn't designed for Windows Home Server, but is very suited to it. It's a small 550kb executable file that has full HTTP file server capability. It utilises a virtual file system, and allows downloading and uploading. You can add users and restrict files and folders as well as bandwidth; all program actions are logged and logging options are adjustable.

The HTML code can be customised to match the design of your site. You can choose any port not currently in use to operate it on, then just forward it in your router and you're away.

The Virtual File System simply contains links to files on your system or network, and you have the ability to hide or secure files listed in the web interface. Adding files or folders is easy through shell extensions (using the right-click context menu). You can also use it to serve HTML pages, though it doesn't support any server-side technologies, it's great for practicing (and showing off) your I33t HTML coding skillz.

To operate on Windows Home Server, it will need to run as a service (like most applications not designed as add-ins). There are tools available to do this through the command line, or you can use the Any Service Installer add-in.



▲ HTTP File System (HFS).

When you run HFS as a service, you will need to save the Virtual File System (VFS) and custom HTML template (if used) to files. These can then be easily edited by another instance of HFS.

And stay tuned, as future versions will pack in much more functionality. It's freeware, and donations are welcome.

Conclusions

This wraps up the overview of Windows Home Server's remote access features, so you too can start sharing pics of your home-made pottery or other creations (eg. children...).

My next guide will cover a range of further add-ins for Windows Home Server, both fun-type ones and management-type ones! (15)

DIFFICULTY **ADVANCED**

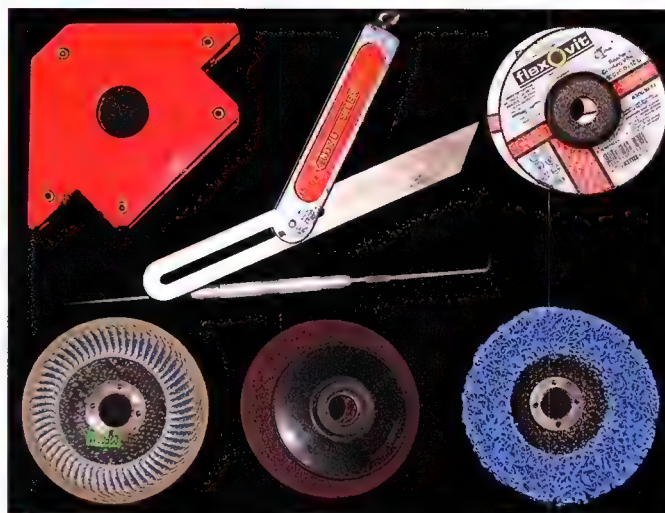
Car Simulator Tutorial Pt 02

Ron Prouse is still busy in pitlane, making his dream car into a reality.

As most of this part of the simulator tutorial deals with metal work, it seemed like a good idea to document some of the tools that we'll be using, especially as they are useful in any form of case-modding venture. There is nothing here that is hugely expensive, but they are worth their weight in Plutonium-239 from a labour-saving perspective! Unfortunately, the abrasive discs don't share the same half life of 24,110 years, so expect to buy quite a few replacements.

The red thing is a magnetic welding square, rated to be able to support 22kg in weight. The different sides enable it to be used at different angles – for example 90°, 45°, and 135° – and it attaches to ferrous metals with the potency of a Limpet mine. Using two of these in combination will secure two pieces of metal in the perfectly correct position for welding, especially in cases where G-clamps are next to useless.

Top-centre is a 'Sliding Bevel', which is basically an adjustable gauge for setting and transferring angles. The handle is connected to a metal blade with a thumbscrew. The blade pivots and can be locked at any angle by



▲ Let's get medieval on its ass...

loosening or tightening the thumbscrew. It can be used in either of two ways; in conjunction with a protractor, it can be set to a pre-determined angle of intersection, or it can be used to duplicate an existing, indeterminate angle onto consecutive joints. Our main use was to copy the angle of intersection of the metal tubes, allowing us to cut the tubes to the correct shape for welding.

Directly below the sliding bevel is a scribe, which is obviously used instead of a pencil. A scribe has two major advantages; firstly, its micro-millimetre point is much more accurate than a pencil tip, but the main positive is that bright, scribed lines are much easier to see when the sparks are flying off of the cutting blades! The only down side is that you can't rub them out easily if you make a mistake.

The last four tools are attachments for a garden variety 100mm angle grinder.

Top-right are cutting and grinding discs, in various thicknesses. For cutting, a 1mm thick disc is perfect, and will give an excellent finish in all gauges of sheet metal, steel plate and tubing. With a little practise it's possible to use an angle grinder like a big Dremel, however it's important to remember that it has a lot more bite if your fingers get in the way! The thicker discs, like the 6mm one pictured here, are used to grind back welds and shape plate.

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We also used a heap of steel stock and sheet in various sizes, and a Repco Ergometer exercise bike!

TOOLS

Some of the tools used in this tutorial might not be found in the average workshop, such as the MIG welder, but most of the work is performed with more mundane items such as a 100mm grinder, drill press and drills, finishing machine/disc sander, and ½ sheet electric sander. The main requirement is a decent bench or table, providing a solid, flat surface to operate on. Or the floor.

Bottom-left is a 'Mop Wheel'. In essence it is a highly-abrasive, sanding flap-wheel, and can also be used to clean up welds and edges. The 40 to 60 grit mop wheels are incredibly aggressive, so you need to be careful with just how much metal is being removed, but their flexibility and ability to 'sculpt' metal is phenomenal.

Bottom-centre is a typical aluminium oxide sanding disc, and the rubber support pad that sits behind it on the grinder. Sanding discs are available in a range of coarse to fine grit grades, and are used to smooth off surfaces to a finish suitable for undercoating/painting.

Bottom-right is a 'strip-it' disc, used to remove paint, rust and scale. The original exercise bike frame had been powder-coated, so we used this pad to buff off the surface prior to welding.

The most important item that we used isn't pictured here – safety glasses. Using any of these cutting or grinding tools without eye protection is asking for serious injury, so make them your first priority.

On with the show

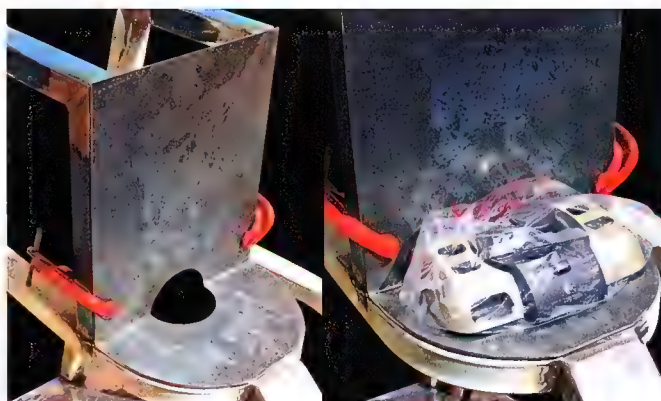
The next step was to fabricate the mount for the steering wheel, with the plan being to use the previous concept of cantilevering a platform out into position. This will maximise strength and rigidity, while minimising the amount of clutter around the knee area, and make getting in and out of the simulator easier. Using the same method outlined in Step 6 of Pt 01 of this tutorial, two sections of 25 x 25mm steel bar were cut and welded to 90°, and then the ends cut to the same angles as the bars that they were being attached to, using the sliding bevel. Using two 22Kg-rated magnetic welding squares to



▲ Over-engineering for strength is not a bad thing for longevity.

DISCLAIMER

Whenever you pick up power tools, cutting and grinding instruments, or even a can of spray paint, you are putting your general wellbeing at risk from some form of industrial level accident. We take every precaution by wearing appropriate safety equipment, using tools with respect and within their limits, and by not inhaling the contents of glue and paint containers. We suggest that you should follow a similar regime, and seek professional assistance and guidance if you are attempting a task outside of your skill set. NB. Atomic and staff are not responsible if you hurt yourself



▲ The audio controls are positioned on a sheet-metal plate between the driver's knees.

hold everything in place, the brackets were tack-welded into position, and then adjusted for 'square' on all three axes – in this case, the measurements were 190mm out and 225mm vertical height. Once lined up, the two brackets were MIG welded into place and the welds dressed with a 40-grit mop wheel.

The area under the steering wheel could have been left open, however we decided to fabricate a fascia plate and create a mounting plate for the audio controls. A metal plate 185 x 330mm in dimension was cut from 2mm thick sheet steel, and a 60mm opening cut out with a hole-saw, with the centre in what would become the bend of the L-shape. With the plate cut, drilled and cleaned up, we used a vice and two lengths of angle iron to clamp it down across its width and bend it 90° into the final shape. The plate was then G-clamped to the frame, and a mop wheel used to shape the curve around the front. This will put the audio controls in easy reach of the driver, and add to the 'console' aesthetics of the steering column.

The next addition was the steering wheel mounting plate. As mentioned, the plate was cantilevered out from the mounting brackets, so 3mm thick steel plate was used to ensure adequate strength – the base of the steering wheel is actually 'outboard' of the bracket structure. A section of plate 270 x 260mm was cut out and tack-welded to the brackets, and then a 1mm cutting disc was used to form the plate to its final shape – the plate tapers from 190mm wide at the very front to 260mm wide under the wheel, and follows the contours of the G25 base down each side. Again, a mop wheel was used to round-off the cut angles into smooth curves. The mounting plate and fascia were then seam welded to the chassis, and the assembly cleaned up with a 120-grit sanding disc.

Finally, although we are far from finished, we can actually sit our ass in the driver's seat and check to see if our 'ergonomic calculations' were as clever as we thought! To our amazement and delight, everything fitted the way that it was supposed to, and has a real-life feel to it. The 275mm of 'fore and aft' seat adjustment meant that the chassis can accommodate drivers from 1.5 to 1.8 metres in height and still maintain a 'suitable' driving position. Even the gear lever reach seemed to retain its relevance, as taller people have longer arms! The audio controls are a little awkward to reach, but as they will only be used occasionally this was deemed to be acceptable.

The only really negative feedback was from one person who complained that the go-kart seat was 'too tight'. For personal safety reasons I will make no further comment on that issue.

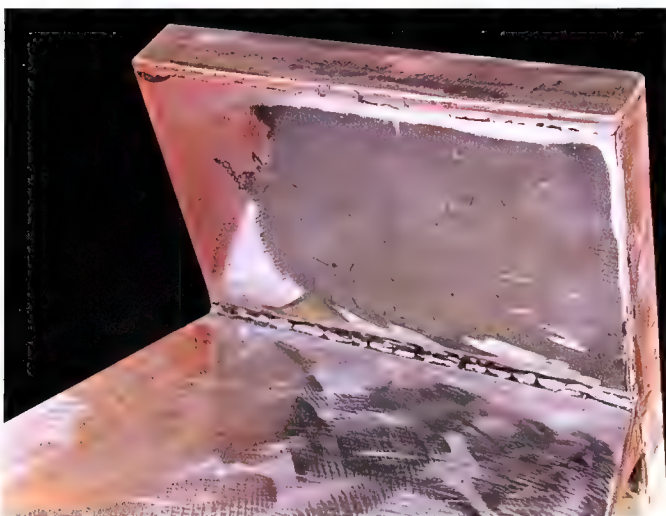


▲ Constant physical checking of the dimensions will make sure that everything fits correctly.

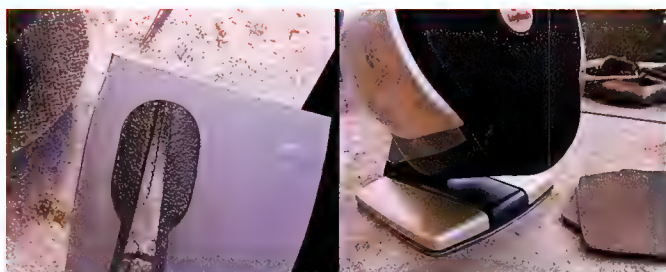
With the steering wheel mounting plate in place, the next step was to tidy up the area at the front of the chassis. The two original uprights for the handlebars were cut down, and a section of 30 x 30 x 3mm angle iron was cut to length, and welded across the top section. A 2mm plate was cut to size and welded into place, and then a mop wheel used to shape and round-off all of the edges. Why so solid? This area will be used as a mounting point for the centre speaker, and adds to the 'dashboard' look of the assembly.

Hopefully you will be able to see the scribe marks in this picture! The next step was to make up the speaker mounting plates, so we will detail the process of cutting and shaping the sheet steel, as it is the same method for all of the plates that we have made.

After cutting the sheet steel to the approximate size, the exact shape of the finished plate is scribed onto the surface – in this case, we've traced around the speaker base. The grinder should be held around the cutting head as if it was a bloody great big marker pen (or fat Cuban cigar, if that's more your style), with the cutting disc at 90° to the surface of the steel plate. Getting used to this grip shouldn't be hard as it is fairly intuitive once you begin to cut, but remain vigilant in keeping your fingers out of the way. Using a solid bench, we clamped down the plate and used the angle grinder with a 1mm



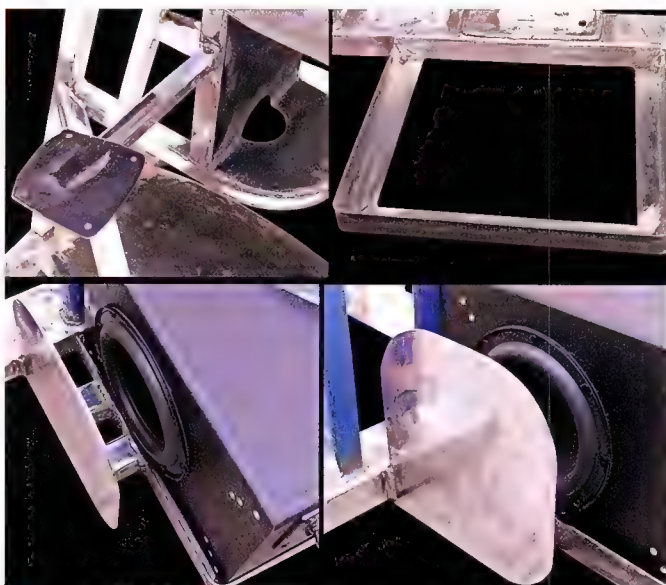
▲ Even the 'dashboard' is constructed out of 3mm steel, and will be the mounting point for the centre speaker.



▲ Fabricating the mounting plates for the front and rear speakers.

disc to carefully cut around the plate, slightly outside of the scribe line. Don't try to cut through the thickness of the steel in one shot, instead cut a series of grooves, getting slightly deeper on each pass, until it eventually 'breaks through'. The final step is to use a disc sander or finishing belt to sand down the plate to the scribed line, and then smooth off all of the edges.

The front speaker base plates were welded onto 19 x 19 x 2mm square bars, 230mm long, and welded to either side of the chassis, just below the steering wheel mounting plate. This will give the two front speakers 580mm of separation, and they are angled in 25° toward the driver's head.



▲ The sub-woofer will be mounted in a secure frame at the rear of the chassis.

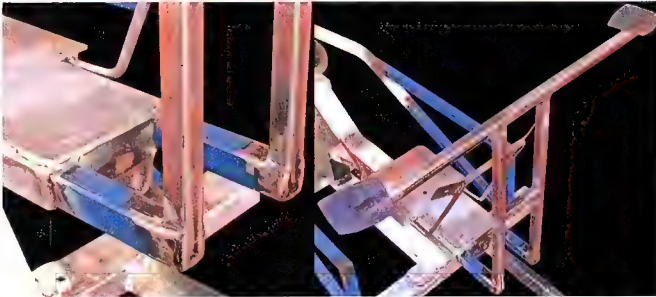
The G51 speakers we're using have four rubber grommets on the underside of the base in a 4mm recess, so getting the mounting positions identical is easy... peel off the grommet and drill a 3mm hole through the recess. Place the speaker on the mounting plate, mark the location of the holes and then drill the holes through the plate. Use an oversized drill bit to countersink the holes on both sides.

The sub-woofer was mounted at the rear of the chassis, using 30 x 30 x 3mm angle iron. Cutting the 90° bends was again a simple variation of Step 6 of Pt 01 of this tutorial, and the welds smoothed off with a mop wheel. The angle iron frame was fabricated to be 5mm larger all-round than the sub-woofer box, so that foam packing can be used to act as a cushion between the two components – which will stop annoying vibration noises when the bass gets thumping.

The final step was a whim, based on fuzzy logic and damage prevention. The sub-woofer will be positioned on its side, which means that the bass driver will face outward rather than downward – putting it in danger of being accidentally kicked-in or inadvertently bashed by the vacuum cleaner. Initially we were going to cover it with a speaker grill, but something in the mists of our mind suggested that a reflex bass speaker will actually work better if it is positioned close to a solid object that is sound-deadened, e.g. the floor, in

its original orientation. A 180 x 180 x 3mm steel plate was cut to a rounded shape, and secured to the angle iron sub-woofer framework with two 70mm long sections of 30 X 30mm square stock. It was also welded to the rear chassis member, to give additional rigidity. The bass driver is now protected, and hopefully its performance will also be maintained and enhanced.

The rear speaker mounts were a little more complicated – getting the height, inward angle and rigidity right was the first issue. We wanted to keep the speakers well away from the driver's shoulders, so they were placed at a 320mm outward spread from centre. We decided that having the bases just above shoulder height was perfect, as that placed the cones level with our ears. Two 200mm sections of 25 x 25 square stock were cut so that they



▲ The rear speakers have 460mm of separation, and are angled toward the driver's ears.

would protrude horizontally 120mm out from the seat base when they were slid inside of the 30 x 30mm seat plate mounts, and welded into place.

The next step was to cut out 20 x 20mm slots into the outer top of the horizontal brackets, and then two 480mm lengths of 19 x 19mm square stock were welded vertically into the slots. A cross-bar was welded between the two uprights at the 240mm point, to tie them together and keep everything square and rigid. The 660mm speaker support bar was then welded into place across the top, and the speaker plates welded on a 25° inward angle to project the sound toward the driver's ears. The temptation to make this assembly look like a rear wing was intense, but we stuck to the plan and kept it basic.

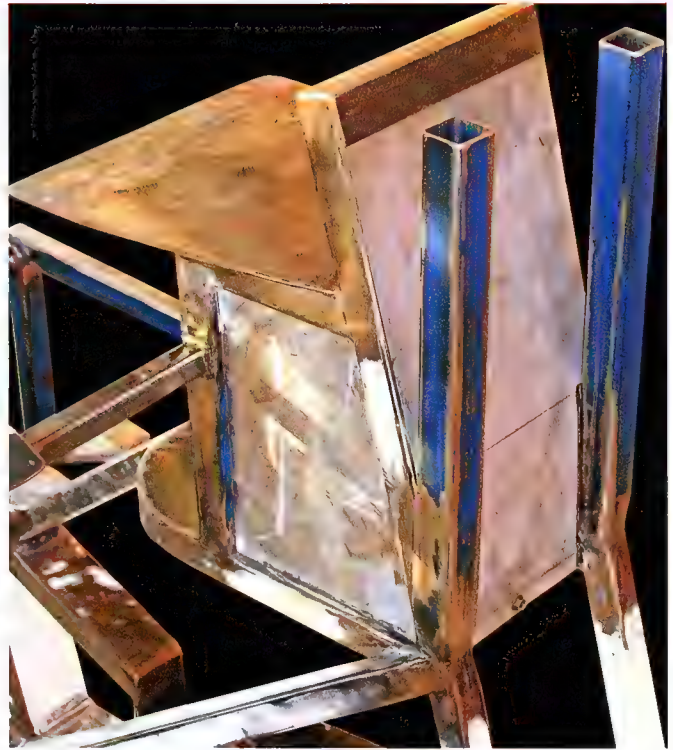
The optical illusion from a 38mm lens is not completely to blame for how this curved bar looks... it actually is tilted 3mm inward from top to bottom. No, this was not on purpose, it was a stuff-up! The simulator hardware is going to include a Butt kicker Gamer (Gearbox, issue 86), so we decided to add a dedicated point on the left-hand rear of the chassis for its attachment. This is actually going to be a bit of an experiment. The Butt kicker Gamer is very effective when clamped to an office chair, which by their very nature are easy to shake and vibrate. The car simulator will be a very different environment, as it is extremely solid and rigid in its construction. Whether the Butt kicker is capable of delivering a similar effect in this situation will be interesting!

The mounts for the screen were the next step. Two sections of 30 x 30mm square stock were cut to length, and filleted so that they would graft on over the existing 25 x 25mm front frame, and then welded into place. A mop and sanding disc were then used to sculpt the joints smooth.



▲ The Letter of the Day is 'n', or is that an 'h'?

The sides of the steering platform were filled in with sections of 1.6mm steel plate, welded along the centre-line of the framework from the inside. The front cover was also fabricated from 1.6mm plate, shaped to follow the contour of the original 25 x 25mm chassis, and secured with a self-tapping screw at the bottom. These three sections of sheet metal form a four-sided



▲ Filling-in the frontal area with sheet metal creates a space to hide wiring.

cubic space, open at the bottom, that will be used to conceal the wiring from the G25 wheel, peripherals and front speakers.

Using the abrasive tools that we mentioned in Part 01, we spent a full day cleaning up all of the welds and smoothing off all sharp edges.



▲ Basically complete, the chassis is now ready for sand-blasting.

At the end of Part 02, the chassis is ready to be taken to a sandblaster for a complete clean-up... and then, depending on the cost, the next step will either be painting or powder-coating. The dimensions, with the seat set on the middle adjustment, are 1.3mtr (L) x 0.7mtr (W) and 0.8mtr (H). The present weight, without hardware, is just under 30 kilograms, so the chassis is actually smaller and lighter than we first thought it would be.

There's still quite a bit to be done in Part 03, with final fitment of the seat, hardware, wiring and LCD screen. We're just hanging out to get behind the wheel!

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Cunning linguistics

Chris Taylor is apparently a fan of puns. Good thing he's got some advice on coding.

Since pretty much the beginning of this here section, we've been advocating gaining experience and fostering knowledge of programming – moreso than any other topic, really – before you start your TAFE or university course. The unit guide for your introductory programming class might say that the teaching staff and prescribed textbook assume no prior knowledge on your part, but the existence of truth in that statement has been found by many a first year programming student to be debatable. Don't misinterpret what we're saying. It really isn't necessary to become 'fluent' in Java over the summer before you start Introduction to Object-Oriented Programming.

That sort of dedication isn't required. Or even that beneficial, if you simply learned by rote from one of those *Learn XYZ in 21 Days* books. No, what we're encouraging you to develop is an understanding of the underlying concepts common to all programming languages. Such an understanding will help you immensely as both a student and programmer, and will make learning new languages relatively painless.

Of course, the best way to learn how programming works is to play with a language or two. Which language you decide to experiment

with is up to you, but we'd recommend not picking something you'll be covering in your one of your subjects. "Languages like Ruby, Python and Perl' would be good choices," according to Atomican dave_blob. He reasons that they are "relatively forgiving, read somewhat close to English and just make sense."

source. Don't just rely on the first book that caught your eye when you wandered into the computing section of the local library. Borrow two or three books and maybe find a few good web-based tutorials. There's a thread (<http://www.atomicmpc.com.au/forums.asp?s=2&c=10&t=824>) in the programming

“ Read multiple interpretations
of the same concepts to
greatly improve understanding... ”

Java and C++ might seem obvious choices. Many a guidebook is available for them, so you'll have no shortage of learning materials. However, these are two languages that really crack a sad when you so much as forget to put a semicolon somewhere. Being hit with a long, cryptic error message is disheartening and confusing. Especially when it's over something so minor as a punctuation mark.

Too, try and learn from more than one

section of our forums that'll provide you with links to a few good ones. Wikipedia can prove useful too. Reading multiple interpretations of the same concepts will greatly improve your understanding of them. When it comes to literature, *for Dummies* and *Learn XYZ* guidebooks can seem the ideal choice for the beginner and they are, but only up to a certain point. These books frequently gloss over important topics you need to understand if you're to be a good programmer in the name of



accessibility. And it's far too easy to learn by rote from such books. Make sure you grab something a little heavier and more in-depth to compliment any such guidebooks you pick up.

With those guidebooks, don't just copy the sample code verbatim and read the theory as if, somehow, they can be divorced from each other. You won't learn a thing by simply punching out a page of syntax. You need to read the theory first. Understand the mechanics of what you're doing and then you might be able to figure out the instructions by yourself without resorting to copying the sample code. Even if you can't produce a complete program from scratch, you'll probably notice ways in which you can improve upon the provided sample.

Much better than books, though, is one's fellow human being. Having a friend who programs for a living would help you immensely. Ply them with alcohol, money or sexual favours and have them go over your code. Hit them with questions when you don't understand a particular concept. Ask for their recommendations of books, websites, short courses and maybe even languages.

Even the best *Learn XYZ* guidebook won't be able to tell you off for writing ugly, inelegant code. And too, a living, breathing person can sometimes explain things much better than any text-based resource. Not everything can or should be self-taught. Rely solely on resources which can't provide you with feedback and you might find you pick up bad habits or misunderstand

vital concepts.

Don't worry too much if you don't know any programmers in-person. Forums can be an invaluable source of information, advice and encouragement for the novice coder. The programming section of our own forums (<http://www.atomicmpc.com.au/forums.asp?s=2&c=10>) is inhabited by a large population of knowledgeable souls who are more than willing to assist the confused but enthusiastic newcomer.

Sticking to it

One other resource worth considering is the short course. Some TAFE institutes will run courses a few weeks in length that, when combined with a

not just the by-rote-in-21-days sense – you've set yourself up for a good many hours of hard work and dull reading. For the first week you might be excited by the idea of learning something new and will happily spend hours with your head hidden behind a guidebook or computer screen, but as time goes by you'll really have to motivate yourself to stick with it when you have infinitely more entertaining books to read and a copy of *Grand Theft Auto IV* to complete. Someone who can kick you up the arse or tell you that you need to work on your understanding of a certain topic would help a lot. So too would tried and true methods of motivation, like setting some realistic goals and developing some 'standards' to adhere to. For instance, you could decide to spend a minimum

“...you'll probably notice ways in which you can improve upon the provided example.”

fair amount of self-study and experimentation on your part, should help you immensely.

Being marked on your progress or simply having another person there, watching over you, willing to review your work, can prove a great source of motivation. Remember that by choosing to teach yourself programming – in the true sense,


of a hour a day – as you might when learning a spoken language in a non-immersion environment – either reading guidebooks, chatting on relevant forums to programmers or simply mucking about with the language.

And again, the point of all this isn't to become fluent in a given language. If you happen to

become so, that's swell, but what's really important – what will actually help you both in your studies and in the future, when you're in a workplace environment – is knowing the concepts behind the syntax, as these are common between all languages. That's not to say the concepts are exactly the same between different languages, but once you understand the mechanics of programming, picking up specific languages shouldn't be too difficult.

Know your tools

Programming languages are but sets of tools useful for solving problems. That, after all, is what you're aiming to do, no? Problem solving – and how it's achieved in a digital environment – is the skill you need to develop most of all. The syntax itself is, at your stage, useful in that it gives you something you can look at and play with – a practical demonstration of the theory, if you will – but it's not the be all and end all, even though the presentation of your *Learn XYZ* book might suggest otherwise. To be a programmer – a real one, as opposed to a bloody parrot with a keyboard – is to understand, rather than just copy, what's really being expressed in the sample code at a deeper level than just "oh, this instruction will let me greet the world because SAMS told me it will let me greet the world." Don't use the guidebooks in this way. Use them to improve your understanding of exactly what the problem is that you're trying to solve in each example – even

<p>THE GREEN ROOM</p> <p>MAGAZINE FEEDBACK</p> <p>WEBSITE FEEDBACK</p> <p>COMMUNITY EVENTS</p> <p>TRADEMARK</p> <p>DIRECT DEALS</p> <p>TECH TALK</p> <p>GRAPHIC HARDWARE</p> <p>AUDIO</p> <p>GPUS AND COOLING</p> <p>OVERCLOCKING</p> <p>MOTHERBOARDS AND RAM</p> <p>BUILDING AND TROUBLE SHOOTING</p> <p>MODDING</p> <p>SYSTEMS AND PERIPHERALS</p> <p>WINDOWS OS</p> <p>OPEN SOURCE OS</p> <p>NETWORKING</p> <p>PROGRAMMING</p> <p>SECURITY</p> <p>GRAPHIC DESIGN</p> <p>3D DESIGN</p> <p>WEB DESIGN</p> <p>DISPLAYS</p> <p>STORAGE AND OPTICAL</p> <p>PODS AND MUSIC PLAYERS</p> <p>MOBILE PHONES</p> <p>LAPTOPS</p>	<p>atomic.edu needs your voice more</p> <p>Superficialism 3/20/08 11:51:32 PM SuperHero Immortal</p>  <p>Next month's article will be about teaching yourself a (or multiple) programming language. Just wondering if folks here have any opinions or experiences they'd care to share with the various methods of self-teaching – i.e. SAMS-type learn xyz in 21 days' books, online tutorials, etc. What has worked for you? How long does it take and how hard is it to teach yourself C++, Java, etc? Any tips? Recommendations? Suggested starting points?</p> <p>Too, I should add, the point of this article is to explore the idea of learning a language—or at least the fundamentals of a language—before you encounter it in a university or TAFE situation. So you're ahead of the rest of the class. So you're quite comfortable with how the language works come assignment/exam time. Also, too a lesser extent I also want to mention the benefits of, say, learning some languages during/after your degree/diploma so you can go to an employer saying, yeah, I know C++, Java and VisualBasic as well as the SQL that was taught to me in the course.</p> <p>Hai gals,</p> <p>Personally, I've found that what's more important than a programming language is the underlying problem solving skills, and the ability to translate those skills to a programming syntax.</p> <p>I've used a teach yourself in 21 days book, but didn't really get into it enough.</p> <p>Anything I've self learnt has been a case of me wanting to do something, then seeking out the code that enables me to do it, not just learning the language from the ground up, but learning the specifics parts I want/need to know.</p> <p>In my course I've encountered Java, PHP, HTML, CSS, mySQL, C, Objective C, and C++ so far. If you knew all of those semi decently you'd be well equipped to do almost anything, and certainly I haven't felt the need to do study outside of my courses scope.</p> <p>I had a basic familiarity with half of the languages in my course, was really good at another quarter, and had never used the other quarter.</p> <p>To be honest, it didn't make much of a difference at all. Hard stuff was hard, easy stuff was easy – especially once you've realized that the only difference between programming languages is how you solve the problem, the solution of the problem itself doesn't change. There have been people in my classes who knew the language much better than I did when we started, yet who still had issues because their problem solving skills weren't nearly as refined as mine, and others in the course.</p> <p>Finally, in terms of difficulty to learn yourself? The biggest problem I've had is motivation. I could learn a host of different languages if I wanted to, but I really can't be stuffed for the most part. If you've got the motivation though, and the ability to solve problems, the ability to understand syntax, and the ability to see that the two separate ideas can be used together to create a good program, I can't foresee you having major troubles with</p>
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the obligatory 'hello world' one – so you can, when you feel up to putting down the book and getting your hands dirty, break the problem into bite-sized pieces, just as a real programmer would, considering them both as individuals and as a whole, before translating it into syntax, rather than the other way round.

Teaching yourself your first programming language probably won't be all that easy – at least not when you're aiming to understand the

concepts rather than just the syntax – but it should prove rewarding. Furthermore, it will give you the edge when you're faced with programming units at a TAFE or university level. Lecturers may tell you that they won't assume you have any prior knowledge of the material, but remember they're speaking from an expert's perspective and, too, are limited by the nature of the thirteen week semester in how long they can spend guiding you through the basics. (E)

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I/O

Daniel Rutter's getting himself all hot under the collar dealing with reader problems.



I/O OF THE MONTH

Not justification for liquid nitrogen cooling

I was just reading an article comparing CPU coolers over at Tom's Hardware when I came across this:

"The worse the cooler performs, the more energy the CPU will consume, as it will be operating at a higher core temperature."

Now, before I dig myself a potential grave, is there any truth to this statement? Do the physical properties of the transistors in a CPU change with temperature in a way that would make it need to draw more power to operate at higher temperatures? Maybe there's more gate leakage for some reason? Or something?

This sounds stupid to me even as I type it, but I guess that with the size of transistors nowadays, there could be some kind of quantum thingamajiggery going on that I don't know about. Or non-quantum thingamajiggery, for that matter. I'm no expert on this stuff. But, if this were to be true, wouldn't thermal runaway be a constant problem? The CPU starts working, producing enough heat to reach, say, 50 degrees, at which temperature it uses (and therefore outputs as heat) a little more power than it did before, which raises its temperature to 51 degrees, at which temperature it uses a little more power, etc, etc?

I can't help thinking that the people who wrote this are professionals, and they wouldn't write something like this if they weren't absolutely sure of it, especially since it seems to go against common sense. But I also can't help but think that the THG guys just figured that since the CPU is hotter, it must be using more power.

Erik Purne

Yes, what the Tom's piece says is actually true. It's not a large effect, though. I don't know exactly what the numbers are for current CPUs, but I think you're looking at less than a 1.3x power increase for the entire

normal operating temperature range of the CPU. So if you increase the core temperature from 20 degrees C to 80 degrees C, you should only expect power draw (and thus heat dissipation) to increase by around 20 per cent.

This is not entirely surprising, because it's normal for electrical components to change their behaviour when their temperature changes.

Ordinary resistive devices, for instance, typically increase in resistance when they get hotter. If you measure the resistance of a light bulb, you'll get a much smaller number than you'd expect, given its power rating and supply voltage. But when the filament's glowing white hot, its resistance is much higher. The same applies, to a greater or lesser extent, to almost all materials. It takes special materials to make resistors that are stable over a wide temperature range – and there are even a few materials, like carbon, that actually *drop* in resistance when they get hot.

Semiconductors are more complicated, but once again changed behaviour with changed temperature is normal. Discrete transistors can easily exhibit the thermal runaway you mention; their gain increases as they get warmer, which causes them to pass more current and dissipate more heat, which increases the gain even more – bingo, one fried transistor. Several other semiconductor devices have this problem too – LEDs, for instance.

In CPUs, I think higher temperatures do indeed increase the amount of current leakage from the tiny transistors, and you then have to feed the processor more power to make up the difference – but don't quote me on that, because I'm no kind of expert. It's theoretically possible for a thermal runaway effect to happen here, too – almost certainly terminating in the CPU overheating and shutting down, rather than any actual damage to the chip – but CPUs are generally well enough cooled that the relatively small power increase with temperature isn't enough to get positive feedback happening.

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in IO. And it looks damn good.



Parallel power

I bought two 40A, 5V switching power supplies for a Peltier experiment I plan on conducting. They each have three channels that provide 13.3A of current. They may or may not be genuinely split, but they say I can connect each channel in parallel. Would it be safe to connect channels from *both* units together in either a parallel or (more importantly) series fashion? That way I could test the efficiency/performance of the thermo-electric coolers (TECs) at both 5V and 10V.

Supposedly, a 16V TEC at around 5V actually moves about 3-4 watts per watt it 'uses' to make it happen. This is almost at the level of phase-change efficiency. Four high-powered TECs operating at 31 per cent voltage might allow for some low-powered, high-cooling processor fun.

Buy hey, it's the fun in the doing that matters. I just hope the doing doesn't end with blue smoke and a melting credit card.

Geoff Sevart

Connecting many kinds of power supply in parallel is possible (deem all of my usual disclaimers about how it's not my fault if you electrocute yourself to have been included here), but it's easy to end up with one PSU actually supplying all of the current and going into overload when the other one's barely working. There shouldn't be any risk of the PSUs just plain blowing up when you connect them in parallel, though.

It's also possible to wire *some* types of power supply in series, but I don't know much about it. My knowledge there pretty much stops at "it's definitely a bad idea to try this with PC PSUs, on account of how their DC ground is probably the same as their AC ground..."

But people definitely do it (tinyurl.com/2PZEWK), so it might work with the PSUs you've got. Don't come smoking to me, though.

If 12V is acceptable for testing, you could get it at high current for a reasonable period of time from a cheap car battery. You could also bodge the output voltage down to 10V-ish with a low value, high-wattage power resistor of some sort. Such a device can be improvised from some fencing or coat-hanger wire wrapped around a brick.

(Bonus points if you manage to incorporate the same power resistor in your final PC.)

You'll need an Amiga RF modulator and three coat hangers...

I Do you know if it's possible to convert the component output from my original-model Xbox 360 to HDMI? My big fancy schmancy TV does not have component input, so my only choice for decent res is VGA, and I want to use that for a media PC.

My TV has 2 HDMI, 1 VGA and 2 SCART inputs.

Do you have any ideas?

Marc Savage

O The cheap option, here, is to just use a monitor switchbox to turn the single VGA input on your TV into two. This should give you considerably better picture quality than a cheap VGA-to-HDMI adapter box. Such adapters can be had on eBay for less than \$70 delivered, but will probably do horrible things to your signal.

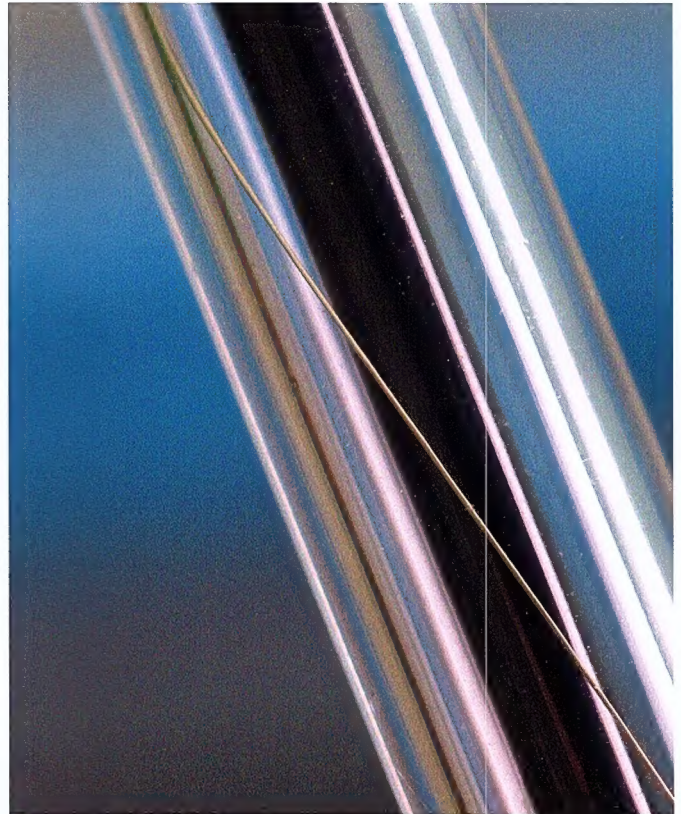
Component-to-HDMI adapters exist, but they can't put resolution into a signal that wasn't there in the first place, and one with good image quality will probably cost quite a lot more than a new Xbox 360. Because HDMI has Digital Rights Management encrustations and earlier standards (including 'VGA' PC analogue video) don't, it's technically impossible to do the job properly (tinyurl.com/322323).

All versions of the 360 after the original edition that you've got, though, have HDMI output. So if you must have HDMI, you might as well just trade up to a newer 360.

Cold Cathode Fragile Lamps

I I am trying to locate 4in cold cathode fluorescent lamps (CCFLs) that don't have acrylic covers on them. Have you ever come across anything like that? I am using the lights to build lightboxes, and the acrylic covers make them too big to install.

Chris



▲ The black tube is 3mm wide; the return wire's *tiny* (it's a spiral in this CCFL, because this lamp is actually already broken).

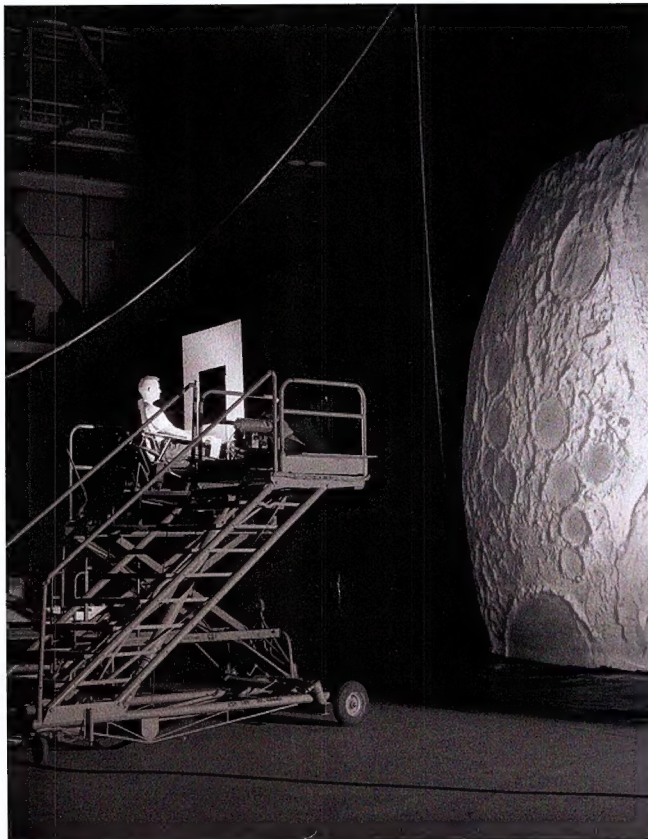
O The plastic tube around standard CCFLs for PC or car illumination is there for protection, because the cold-cathode lamps themselves are very fragile, and the hair-thin return wire that runs *next* to the lamp itself is even *more* fragile. The return wire has to be there because these kinds of lamps have their two power connections on only one end, but the physical tube has one terminal on each end.

If you want 'nude', non-encapsulated white CCFLs without a return wire, you might like to check out replacement backlights for laptops and LCD monitors. They'll have a wire coming out of each end, and no protective tube. They also won't come with a handy-dandy 12V inverter, but I think they ought to run fine from any inverter that'll run an encapsulated lamp of similar length. Expect to pay \$US20 or less for one tube, delivered, from an eBay dealer.

The problem with backlight lamps, of course, is that few laptops have a screen so small that it needs only a four-inch backlight, and you can't exactly cut these things to length.

If you absolutely must use a tube length (or colour) that you can't find as a bare lamp, you could try cutting the protective tube off the usual kind of lamp. This might not be as hard as you'd think, since as far as I can see, the lamps are pretty much just sitting loose inside the protective tube.

The caps on the ends of the protective tube are likely to be glued in place very solidly, but if you clamp those ends in place and cut around the tube in the middle – perhaps with a hot-knife rather than a hacksaw, to minimise trauma for the lamp inside – you should be able to just pull the halved protective tube off either end of the CCFL inside. You'll still need to cut the supply wires to completely remove one half of the protector, but you can always solder them together again afterward.



▲ NASA pretty much cracked the big-display problem in 1961.

FALLOUT

Funnies and
humour from the
fallout zone

FALLOUT



Army of Who?

Logan Booker questions the super powers of two men and their guns.

I didn't believe Salem when he said we could have unlimited, super-powered bullets just by standing with our backs to each other. Or that he could turn invisible, just by having me shoot everything instead of him.

Of course I thought he was full of crap. Wouldn't any normal person?

At the time, we were crouched behind an old car, with rounds flying over our heads. We were in Somalia, or Iraq. Maybe China. The places kind of blend together after a while. But none of that's important. What was important to me, at that moment in time, was making sure Salem didn't entirely flip out and shoot me instead of the bad guys. I particularly didn't want to piss him off as he was carrying the world's largest man-portable chain gun.

"Where'd you get that?" I asked.

"What, this?" he said, hefting the weapon onto his knee. I swore I heard something crack. His sanity, perhaps.

"Yes, that. You'll have someone's head off if you're not careful."

"I thought that was the idea?"

It was, I thought to myself. But he looked ridiculous, firing the thing with one arm.

He grabbed my shoulder. "Let's do it. Right now. We stand up, back to back, and take them out."

"How is that possibly going to work?"

"It's like the Matrix..."

"Except this isn't the Matrix."

"Well, no. But it's like that."

I sighed.

"And then what?"

"And then we shoot. At the bad guys."

I stared at him in disbelief. His eyes screamed insanity to me.

"What if it doesn't work?"

"It'll work, trust."

"No, I don't trust you."

His face twisted in confusion. "Well, I suppose we'd bleed a bit."

"A bit?"

"Okay, maybe a lot. But we can just hide back here again until it stops."

It was quickly becoming obvious that Salem had bought a one-way ticket out of Reality Town and was well on his way to Make Believe Central. His train had to be derailed.

"That's not how bleeding works, Salem. Traditionally, one continues to bleed until they're bandaged. That, or until they die."

"Yes, but..."

"No, but Salem. That's how blood works. It's a liquid, you understand. Remember how we talked about buckets, holes and leaks? It's like that."

Salem made a sad face. "So no back-to-back?"

"No back-to-back. We take them out, one at a time, until they're all dead. That's what sensible people do. And then we pray."

"Pray?" Salem had his quizzical puppy look down pat.

"Our employers have a habit of 'renegotiating' our payments Salem. I need new armour, ammo and a gold-plated AK-47."

"And me?"

"You need a stress ball." Or a box of Ritalin, I mused.

"What if they don't pay?"

"We do the bleeding thing - to them."

"Like a girl?"

I sighed again.

"Just shut up and shoot that silly gun of yours."

NEXT MONTH



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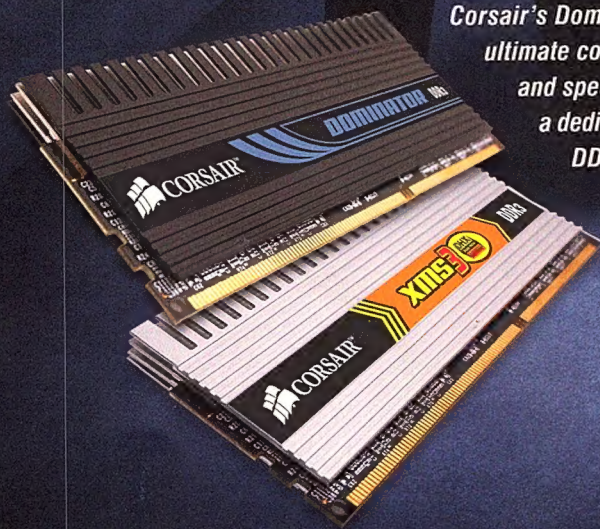
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